THO: HARPER

THO: HARPER

# THE

# ACCOMPTANT's COMPANION:

## OR, THE

# Young Arithmetician's Guide.

BEING

An EASY INTRODUCTION to ARITHMETIC, in WHOLE NUMBERS, and FRACTIONS, VULGAR and DECIMAL, each Rule exemplified by a Number of Queſtions to make the whole plain and familiar; Extraction of the Square and Cube Roots, and their Application to Uſe, Intereſt, Simple and Compound, Annuities, Rebate, and Equation of Payments, a Collection of Queſtions with their Anſwers.

Serving to Illuſtrate all the Rules; with Variety of Bills of Parcels, *&c.* to qualify Youth for Trade and Buſineſs:

To which is added,

An APPENDIX of CROSS MULTIPLICATION, applied to MENSURATION, as uſed by different Artificers.

The Whole

Deſigned for the Uſe of SCHOOLS, and is recommended by ſeveral Eminent MATHEMATICIANS and SCHOOL-MASTERS.

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*By THOMAS HARPER,*

Maſter of the ACADEMY in *Harley-ſtreet, Cavendiſh Square.*

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MDCCLXI.

[Price Two Shillings.]

# *ERRATA.*

PAge 11, Line 3, for 8 read 1. Page 28, Line 27, for 29 Read 92. Page 38, Line 34, for 2 read 12. Page 39, Line 24, for *Qr* read *Chal.* Page 41, Line 12, for 4 read 0. Page 60, Line 24, for 05 read 95. Page 61, Line 29, for 52 read 32. Page 64, Line 3, for 44 read 4. Page 65, Line 3, for 11*s*. read 15*s*, Page 65, Line 4, for 1*Oz*. read 8. Page 65, Line 13, for $\frac{12}{3}$ read $\frac{2}{3}$. Page 66, Line 2, for 16 read 36. Page 66, Line 5, for $\frac{4}{15}$ read $\frac{14}{15}$. Page 67, Line 25, for $\frac{4}{15}$ read $\frac{4}{10}$. Page 69, Line 11, for $1\frac{2}{3}$ read $11\frac{2}{3}$. Page 70, Line 1 , for $\frac{52}{268}$ read $\frac{52}{168}$. Page 70, Line 26, for $14\frac{3}{3}$ read $141\frac{3}{5}$. Page 70, Line 29, for $\frac{5}{3}$ read $\frac{1}{4}$. Page 72, Line 8, for $\frac{0}{5}$ read $\frac{2}{5}$. Page 77, Line 14, for 2 read 3. Page 81, Line 10, for 132*l*. read 1132*l*. Page 81, Line 15, for 44 read 144. Page 85, Line 29, for 6903 read 6930. Page 100, Line 31, for 6 read 1. Page 1 0, Line 1, from *Time to from*, read *multiplied by the Ratio, and to the Product add twice the Time*. Page 143, Line 3, for 8 read 18. Page 143, Line 6, for 2 read 12.

BRITISH MUSEUM

# THE

# PREFACE.

MY Deſign in Publiſhing the following Sheets, is not only intended as an Help towards the Improvement of Youth, in that noble and uſeful Science, Arithmetic; but as an Aſſiſtant (not an Inſtructor) to the worthy Maſters, under whoſe Care they are intruſted.

Arithmetic, both Vulgar and Decimal, is rendered eaſy and familiar to the meaneſt Capacity, in Intereſt and Annuities; Mr. *Ward*'s Method is followed, with this Difference only, that here is explained the Rules or Theorems in Words, as being moſt ſuitable to the Arithmetician.

To render it of more general Uſe, I have added an Appendix, ſhewing the Method of ſquaring Dimenſions (commonly called Croſs Multiplication,) and have illuſtrated the ſame with variety of Examples; ſo that in the whole, I have omitted nothing I judged uſeful.

I have taken care to keep it as free as poſſible from the Errors of the Preſs; but if any, I hope the Reader will correct and excuſe.

*Academy* in *Harley Street,*
*Cavendiſh Square,*
*May* 20, 1761.

**THOMAS HARPER.**

WE, whoſe names are underwritten, having peruſed a Book, intitled, *The* ACCOMPTANT'S COMPANION, or, *The Young Arithmetician's Guide*, not only recommend the uſe of it to others, for the ſpeedy improvement of Youth in Arithmetic, but alſo ſubſcribe to the ſame for the uſe of our Schools.

*Mr.* Crawford, *maſter of the academy in Croſs-Street, Hatton Gardens.*

*Mr.* Davis, *maſter of the brewers grammar-ſchool, and of the academy, Iſlington.*

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*Mr*. Curchod, *maſter of the academy in Wellcloſe Square.*

*Mr*. Davies, *maſter of the academy on Mount Pleaſant, near Old Gravel-Lane, Ratcliff Highway.*

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*Mr*. Goodgier, *ſchoolmaſter*, *in New-Square*, *Minories.*

*Mr*. White, *ſchoolmaſter*, *in George-Street*, *Spittle-Square.*

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*Mr*. Michon, *ſchoolmaſter*, *Red-lion Market*, *St. Luke's.*

*Mr*. Shortland, *ſchoolmaſter*, *St. Anne's Lane*, *Alderſgate.*

*Mr*. Healer, *ſchoolmaſter*, *in Drury-Lane.*

*Mr*. Bellas, *maſter of the free-ſchool at Chelſea.*

# Of ARITHMETIC.

ARITHMETIC is an Art, or Science, which treats of the Power and Uſe of Numbers, and conſiſts of three Parts, *viz.*

1, Whole Numbers.
2, Vulgar Fractions.
3, Decimal Fractions.

Arithmetic is likewiſe Theoretical and Practical.

Theoretical Arithmetic regards the Nature and Quality of Numbers, and ſhews the Reaſon and Foundation of practical Operations; and, in this Senſe, it is termed a Science.

Practical Arithmetic ſhews the Method of working thoſe Demonſtrations by Numbers, ſo as to be moſt uſeful and expeditious for Buſineſs; and, in this Senſe, it is termed an Art, and is founded upon theſe five following Rules, *viz.* Notation, Addition, Subtraction, Multiplication, and Diviſion.

## Of NOTATION.

NOTATION ſhews the Manner of expreſſing any Sum by certain Characters, or Figures.

The Characters uſed by the antient *Romans* were the ſeven following, *viz.*

| I. | V. | X. | L. | C. | D. | M. |
|---|---|---|---|---|---|---|
| **One,** | **Five,** | **Ten,** | **Fifty,** | **One Hundred,** | **Five Hundred,** | **One Thouſand.** |

But the Moderns expreſs Numbers by the ten following Marks or Figures, call'd *Arabic*, *viz.* One, 1; Two, 2; Three, 3; Four, 4; Five, 5; Six, 6; Seven, 7; Eight, 8; Nine, 9; Nought, or Cypher, 0.

## *The* TABLE.

| 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|---|
| Hundreds of Millions | Ten of Millions | Millions | Hundreds of Thouſands | Tens of Thouſands | Thouſands | Hundreds | Tens | Units |

The Value of each Figure is known by the Place it poſſeſſes; the firſt Figure towards the Right Hand expreſſes its Value in Units, the ſecond in Tens, the third in Hundreds, the fourth in Thouſands, *&c.* each Figure being ten Times as that on its Right Hand.

### EXAMPLES.

Write down the following Numbers in proper Figures.

Forty-eight
One Hundred and Forty-four
Two Thouſand and Sixty-ſix
Fifty Thouſand Six Hundred and Four
Eleven Thouſand Eleven Hundred and Eleven
One Hundred and Seventy Millions Six Hundred and Fifty-nine Thouſand Eleven Hundred and Twelve

Write down the following Numbers, in Words, at Length, *viz.*

89—711—4171—417614—7917111—741716111.

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## SIMPLE ADDITION,

IS the gathering together two or more Numbers of the ſame Name, into one, which is called the Sum Total.

As, If I have 274 Books in the *Latin* Tongue, 378 in the *French*, and 844 in the *Engliſh*, how many Books are there in all? You muſt write them down in the following Manner:

274 *Latin*
378 *French*
844 *Engliſh*
1496 Sum of the whole.

When you have ſo done, draw a Line under, as you ſee; then begin towards the Right Hand, and add up that Row, which you will find to be 16; then put down the 6, and carry one (which is one Ten) to the next Row, the Place of Tens, and you will find it to be 19; then put down 9, and carry one to the Place of Hundreds, and you will find that to be 14, which put down, and the Work is done.

## GENERAL RULE.

Place all Numbers of the ſame Kind under one another, add up the Units, and, if their Sum be under Ten, ſet that Sum underneath; but if equal to Ten, or Tens, ſet the Exceſs underneath, and, for every Ten, carry an Unit to the next Place; and ſo proceed.

### EXAMPLES.

| *Pounds* | *Guineas* | *Yards* | *Feet* |
|---|---|---|---|
| 21 | 73 | 571 | 4971 |
| 71 | 98 | 198 | 4761 |
| 82 | 76 | 768 | 9876 |
| 36 | 49 | 179 | 5198 |

| *Days* | *Hours* | *Minutes* |
|---|---|---|
| 47141 | 471491 | 5716817 |
| 97176 | 123456 | 4985176 |
| 48498 | 789876 | 5123654 |
| 51614 | 512345 | 2878465 |
| 71987 | 618987 | 5987652 |
| 41709 | 416128 | 7198567 |
| 17890 | 518217 | 9174618 |
| 59764 | 123456 | 1789716 |
| 17197 | 149176 | 5198176 |

# COMPOUND ADDITION,

Is the adding together ſeveral Numbers of divers Denominations, as Pounds, Shillings and Pence, Hundreds, Quarters, Pounds, *&c.*

## Of MONEY.

N. B. £. placed over any Number ſignifies Pounds, *s.* Shillings, *d.* pence; and ¼ after the Pence is one Farthing, ½ a Halfpenny, or two Farthings, ¾ three Farthings.

Before I proceed any farther, I think it will be better to give the following Tables, which may be learnt by Heart.

### *Table of Pence.*

| *d.* | | £. | *s.* | *d.* |
|---|---|---|---|---|
| 12 | *is equal to* | 0 | 1 | 0 |
| 20 | ——— | 0 | 1 | 8 |
| 24 | ——— | 0 | 2 | 0 |
| 30 | ——— | 0 | 2 | 6 |
| 36 | ——— | 0 | 3 | 0 |
| 40 | ——— | 0 | 3 | 4 |
| 48 | ——— | 0 | 4 | 0 |
| 50 | ——— | 0 | 4 | 2 |
| 60 | ——— | 0 | 5 | 0 |
| 70 | ——— | 0 | 5 | 10 |
| 72 | ——— | 0 | 6 | 0 |
| 80 | ——— | 0 | 6 | 8 |
| 84 | ——— | 0 | 7 | 0 |
| 90 | ——— | 0 | 7 | 6 |
| 96 | ——— | 0 | 8 | 0 |
| 100 | ——— | 0 | 8 | 4 |
| 108 | ——— | 0 | 9 | 0 |
| 110 | ——— | 0 | 9 | 2 |
| 120 | ——— | 0 | 10 | 0 |
| 240 | ——— | 1 | 0 | 0 |
| 252 | ——— | 1 | 1 | 0 |
| *Note,* 48 | Farthings | 0 | 1 | 0 |
| 960 | Farthings | 1 | 0 | 0. |

### *Table of Shillings.*

| *s.* | | £. | *s.* |
|---|---|---|---|
| 20 | *is equal to* | 1 | 0 |
| 30 | ——— | 1 | 10 |
| 40 | ——— | 2 | 0 |
| 50 | ——— | 2 | 10 |
| 60 | ——— | 3 | 0 |
| 70 | ——— | 3 | 10 |
| 80 | ——— | 4 | 0 |
| 90 | ——— | 4 | 10 |
| 100 | ——— | 5 | 0 |
| 110 | ——— | 5 | 10 |
| 120 | ——— | 6 | 0 |
| 130 | ——— | 6 | 10 |
| 140 | ——— | 7 | 0 |
| 150 | ——— | 7 | 10 |
| 160 | ——— | 8 | 0 |
| 170 | ——— | 8 | 10 |
| 180 | ——— | 9 | 0 |
| 190 | ——— | 9 | 10 |
| 200 | ——— | 10 | 0 |
| 300 | ——— | 15 | 0 |
| 400 | ——— | 20 | 0 |
| 500 | ——— | 25 | 0 |
| 1000 | ——— | 50 | 0 |

There are ſome other Names of Money uſed in *England,* as

| | | | | |
|---|---|---|---|---|
| A Moidore | is equal to | 1 | 7 | 0 |
| A Guinea | ——— | 1 | 1 | 0 |
| A Half Guinea | ——— | 0 | 10 | 6 |
| A Crown | ——— | 0 | 5 | 0 |
| A Half Crown | ——— | 0 | 2 | 6 |

The following are only imaginary Pieces:

| | | £. | s. | d. |
|---|---|---|---|---|
| A Carolus | *is* | 1 | 3 | 0 |
| A Jacobus | ——— | 1 | 5 | 0 |
| A Mark | ——— | 0 | 13 | 4 |
| An Angel | ——— | 0 | 10 | 0 |
| A Noble | ——— | 0 | 6 | 8 |

## EXAMPLES.

| 10 | 20 | 12 4 | 10 | 20 | 12 4 | 10 | 20 | 12 4 |
|---|---|---|---|---|---|---|---|---|
| £. | *s.* | *d.* | £. | *s.* | *d.* | £. | *s.* | *d.* |
| 7 | 11 | 6¼ | 14 | 11 | 3½ | 714 | 11 | 3½ |
| 9 | 10 | 7¾ | 19 | 10 | 11¾ | 411 | 19 | 10¼ |
| 4 | 11 | 3¼ | 17 | 10 | 11½ | 131 | 17 | 6½ |
| 1 | 10 | 1½ | 41 | 13 | 1½ | 111 | 11 | 11½ |

*N. B.* The Numbers placed over the Characters ſhew at what you muſt carry; as 4 at Farthings, 12 at Pence, 20 at Shillings, and 10 at Pounds; and is as much as to ſay,

| | | |
|---|---|---|
| 4 Farthings | *make* | 1 Penny |
| 12 Pence | ——— | 1 Shilling |
| 20 Shillings | ——— | 1 Pound |

## EXAMPLES.

| 10 | 20 | 12 4 | 10 | 20 | 12 4 | 10 | 20 | 12 4 |
|---|---|---|---|---|---|---|---|---|
| £. | *s.* | *d.* | £. | *s.* | *d.* | £. | *s.* | *d.* |
| 741 | 11 | 6½ | 478 | 13 | 10¼ | 411 | 13 | 11½ |
| 514 | 10 | 7¼ | 412 | 18 | 11½ | 178 | 10 | 10½ |
| 796 | 19 | 8¾ | 349 | 17 | 9¾ | 234 | 11 | 9¾ |
| 417 | 17 | 10½ | 718 | 10 | 8½ | 567 | 18 | 8½ |
| 612 | 17 | 10¼ | 576 | 11 | 7½ | 819 | 11 | 7¼ |
| 319 | 10 | 9½ | 498 | 12 | 6¾ | 512 | 13 | 6¾ |
| 412 | 11 | 8½ | 712 | 13 | 5½ | 141 | 11 | 5½ |

| 10 | 20 | 12 4 |
|---|---|---|
| £. | s. | d. |
| 411 | 11 | 6½ |
| 714 | 13 | 11¾ |
| 198 | 14 | 9¼ |
| 411 | 17 | 8¾ |
| 618 | 16 | 7½ |
| 911 | 11 | 6¾ |
| 714 | 10 | 5½ |
| 611 | 17 | 4¼ |
| 917 | 11 | 3½ |

| 10 | 20 | 12 4 |
|---|---|---|
| £. | s. | d. |
| 511 | 13 | 6½ |
| 718 | 14 | 7¼ |
| 416 | 12 | 9½ |
| 719 | 11 | 3½ |
| 418 | 17 | 7½ |
| 716 | 16 | 8¼ |
| 419 | 15 | 9¾ |
| 417 | 14 | 1½ |
| 419 | 10 | 6¼ |

| 10 | 20 | 12 4 |
|---|---|---|
| £. | s. | d. |
| 511 | 19 | 6½ |
| 111 | 11 | 9¾ |
| 714 | 13 | 11¼ |
| 911 | 17 | 7¾ |
| 617 | 16 | 8½ |
| 181 | 15 | 9¼ |
| 419 | 14 | 6½ |
| 761 | 13 | 5¾ |
| 141 | 10 | 4½ |

| 10 | 20 | 12 4 |
|---|---|---|
| £. | s. | d. |
| 471 | 6 | 11½ |
| 419 | 10 | 10 |
| 716 | 7 | 11½ |
| 417 | 9 | 6 |
| 198 | 8 | 5¾ |
| 478 | 7 | 3 |
| 416 | 6 | 4½ |
| 416 | 5 | 1 |
| 711 | 19 | 2 |
| 611 | 17 | 0¾ |

| 10 | 20 | 12 4 |
|---|---|---|
| £. | s. | d. |
| 471 | 11 | 6½ |
| 711 | 17 | 7¼ |
| 416 | 16 | 8¾ |
| 417 | 9 | 11½ |
| 516 | 8 | 3¼ |
| 417 | 7 | 6½ |
| 111 | 6 | 9¾ |
| 222 | 5 | 10½ |
| 333 | 4 | 11¼ |
| 444 | 13 | 6½ |

| 10 | 20 | 12 4 |
|---|---|---|
| £. | s. | d. |
| 711 | 10 | 11½ |
| 617 | 11 | 10¾ |
| 421 | 17 | 11¾ |
| 611 | 18 | 6¼ |
| 718 | 11 | 7¾ |
| 614 | 10 | 8½ |
| 718 | 11 | 9¼ |
| 417 | 17 | 5½ |
| 111 | 16 | 4¾ |
| 222 | 9 | 6½ |

## Of TROY-WEIGHT.

| *N. B.* | | | | |
|---|---|---|---|---|
| | 24 Grains | *make* | 1 Pennyweight | dwt. |
| | 20 Pennyweights | —— | 1 Ounce | oz. |
| | 12 Ounces | —— | 1 Pound | lb. |

*Note*, This Weight only gives five Score to the Hundred; and by it is weighed Gold, Silver, Jewels, Bread, and Liquors.

EXAMPLES.

## EXAMPLES.

| 10 | 20 | 24 |
|---|---|---|
| *Oz.* | *dwt.* | *gr.* |
| 4 | 10 | 11 |
| 6 | 6 | 13 |
| 4 | 4 | 17 |
| 1 | 2 | 11 |

| 10 | 12 | 20 | 24 |
|---|---|---|---|
| *lb.* | *oz.* | *dwt.* | *gr.* |
| 6 | 10 | 11 | 13 |
| 7 | 11 | 19 | 16 |
| 8 | 10 | 17 | 11 |
| 4 | 11 | 17 | 10 |

The Numbers placed above the Characters ſhew at what you muſt carry; as in Addition of Money, and will be an Help to the Memory: Obſerve the ſame in all the proceeding Additions.

| 10 | 12 | 20 | 24 |
|---|---|---|---|
| *lb.* | *oz.* | *dwt.* | *gr.* |
| 471 | 10 | 13 | 11 |
| 417 | 11 | 14 | 12 |
| 614 | 10 | 15 | 13 |
| 971 | 6 | 16 | 14 |
| 416 | 8 | 17 | 15 |
| 141 | 9 | 18 | 16 |
| 497 | 7 | 19 | 17 |
| 614 | 6 | 17 | 18 |
| 976 | 5 | 16 | 19 |
| 179 | 4 | 13 | 20 |

| 10 | 12 | 20 | 24 |
|---|---|---|---|
| *lb.* | *oz.* | *dwt.* | *gr.* |
| 416 | 11 | 19 | 18 |
| 171 | 10 | 18 | 17 |
| 614 | 9 | 17 | 16 |
| 413 | 6 | 11 | 13 |
| 611 | 11 | 17 | 11 |
| 419 | 10 | 16 | 10 |
| 716 | 9 | 15 | 11 |
| 419 | 8 | 13 | 12 |
| 598 | 7 | 12 | 14 |
| 764 | 6 | 11 | 16 |

## Of AVOIRDUPOIS WEIGHT.

| | | | |
|---|---|---|---|
| 16 Drams | *make* | 1 Ounce | *oz.* |
| 16 Ounces | —— | 1 Pound | *lb.* |
| 28 Pounds | —— | 1 Quarter of a hundred weight | *qr.* |
| 4 Quarters | —— | 1 Hundred weight | *C.* |
| 20 Hundred | —— | 1 Ton | *Tn.* |

*Note*, This Weight is uſed in weighing any Thing of a droſſy Nature, as all Grocery, Chandlers Wares, and all

Metals, except Silver and Gold, but differeth in divers Goods and Places, by Cuſtom and Statute Law; for

| | *lb.* |
|---|---|
| A Barrel of Anchovies is | 30 |
| —— Figs, from 268 Pounds, to | 98 |
| A Barrel of Raiſins — | 112 |
| —— Gunpowder — | 112 |
| —— Candles — | 120 |
| —— Potaſh — | 200 |
| —— Butter — | 224 |
| —— Soap — | 256 |
| A Puncheon of Prunes, 10 or 12 hundred | |
| A Stone of Glaſs is | 5 |
| —— Butchers Meat | 8 |
| —— Iron, Wool, &c. | 14 |
| —— Butter and Cheeſe | 16 |
| A Quintal of dry Fiſh | 100 |

| | *lb.* |
|---|---|
| A Faggot of Steel — | 120 |
| A Seam of Glaſs — | 120 |
| A Burden of Gad Steel | 180 |
| A Clove of Cheeſe and Butter — — | 8 |
| A Wey, in Suffolk, is 32 Cloves, or | 336 |
| A Fodder of Lead is 19*C.* 2*qrs.* | |
| A Clove of Wool is | 7 |
| A Todd is — — | 28 |
| A Wey is 6 Todd and one Stone, or — | 182 |
| A Sack is 2 Weys, or | 364 |
| A Laſt is 12 Sacks, or | 4368 |

## EXAMPLES.

| 10 | 20 | 4 |
|---|---|---|
| *T* | *C* | *qr.* |
| 41 | 10 | 1 |
| 17 | 11 | 2 |
| 16 | 11 | 1 |
| 17 | 11 | 1 |
| 61 | 19 | 2 |

| 10 | 20 | 4 | 28 | 16 |
|---|---|---|---|---|
| *T* | *C* | *qr.* | *lb.* | *oz.* |
| 47 | 19 | 1 | 17 | 13 |
| 19 | 11 | 2 | 18 | 14 |
| 16 | 17 | 3 | 20 | 10 |
| 71 | 19 | 1 | 13 | 11 |
| 48 | 16 | 0 | 11 | 12 |

| 10 | 20 | 4 | 28 | 16 | 16 |
|---|---|---|---|---|---|
| *T* | *C* | *qr.* | *lb.* | *oz.* | *dr.* |
| 471 | 10 | 1 | 10 | 10 | 11 |
| 511 | 11 | 1 | 11 | 10 | 6 |
| 617 | 9 | 2 | 10 | 11 | 7 |
| 161 | 8 | 3 | 17 | 11 | 8 |
| 189 | 7 | 2 | 16 | 13 | 9 |
| 716 | 16 | 1 | 15 | 14 | 10 |
| 497 | 13 | 0 | 14 | 11 | 11 |
| 651 | 14 | 1 | 13 | 10 | 12 |
| 471 | 11 | 2 | 12 | 9 | 13 |
| 614 | 10 | 3 | 12 | 8 | 14 |

| 10 | 20 | 4 | 28 | 16 | 16 |
|---|---|---|---|---|---|
| *T* | *C* | *qr.* | *lb.* | *oz.* | *dr.* |
| 471 | 10 | 1 | 17 | 10 | 11 |
| 171 | 11 | 1 | 18 | 11 | 10 |
| 614 | 10 | 2 | 16 | 10 | 13 |
| 718 | 11 | 3 | 15 | 13 | 14 |
| 416 | 17 | 1 | 13 | 14 | 11 |
| 191 | 18 | 0 | 10 | 6 | 10 |
| 516 | 16 | 2 | 19 | 5 | 9 |
| 789 | 15 | 1 | 17 | 4 | 8 |
| 614 | 13 | 3 | 11 | 3 | 7 |
| 516 | 19 | 1 | 10 | 2 | 6 |

## Of APOTHECARIES WEIGHT.

| | | | |
|---|---|---|---|
| 20 Grains | *make* | 1 Scruple | ℈ |
| 3 Scruples | ——— | 1 Dram | ʒ |
| 8 Drams | ——— | 1 Ounce | ℥ |
| 12 Ounces | ——— | 1 Pound | *lb.* |

*Note*, Apothecaries ſell by this Weight, but buy by Avoirdupois.

| 10 | 12 | 8 | 3 |
|---|---|---|---|
| *lb.* | ℥ | ʒ | ℈ |
| 471 | 10 | 1 | 1 |
| 617 | 11 | 6 | 2 |
| 716 | 10 | 5 | 0 |
| 987 | 11 | 2 | 1 |
| 496 | 10 | 3 | 2 |
| 416 | 6 | 6 | 1 |
| 917 | 5 | 7 | 2 |
| 618 | 4 | 4 | 1 |

| 10 | 12 | 8 | 3 |
|---|---|---|---|
| *lb.* | ℥ | ʒ | ℈ |
| 171 | 10 | 6 | 2 |
| 417 | 11 | 1 | 1 |
| 614 | 9 | 1 | 1 |
| 716 | 8 | 2 | 2 |
| 491 | 7 | 3 | 1 |
| 614 | 6 | 4 | 0 |
| 718 | 5 | 5 | 0 |
| 416 | 4 | 7 | 1 |

| 10 | 12 | 8 | 3 | 20 |
|---|---|---|---|---|
| *lb.* | ℥ | ʒ | ℈ | *grs.* |
| 711 | 10 | 1 | 0 | 17 |
| 417 | 11 | 2 | 1 | 16 |
| 611 | 10 | 3 | 2 | 15 |
| 417 | 11 | 4 | 0 | 16 |
| 517 | 9 | 5 | 0 | 17 |
| 618 | 8 | 6 | 1 | 18 |
| 716 | 7 | 7 | 2 | 19 |
| 419 | 6 | 0 | 0 | 17 |

| 10 | 12 | 8 | 3 | 20 |
|---|---|---|---|---|
| *lb.* | ℥ | ʒ | ℈ | *grs.* |
| 716 | 10 | 1 | 0 | 17 |
| 471 | 11 | 2 | 1 | 15 |
| 614 | 11 | 3 | 1 | 16 |
| 711 | 9 | 4 | 2 | 17 |
| 471 | 8 | 5 | 0 | 18 |
| 614 | 7 | 6 | 1 | 19 |
| 911 | 6 | 7 | 2 | 16 |
| 49 | 5 | 5 | 1 | 13 |

## Of CLOTH MEASURE.

| | | | |
|---|---|---|---|
| 2 Inches 1-4th | *make* | 1 Nail | *na.* |
| 4 Nails | ——— | 1 Quarter of a Yard | *qrs.* |
| 5 Quarters | ——— | 1 Ell *Engliſh* | *E Eng.* |
| 3 Quarters | ——— | 1 Ell *Flemiſh* | *E Flem.* |
| 6 Quarters | ——— | 1 Ell *French* | *E Fren.* |

EXAMPLES.

## EXAMPLES.

| 10 | 4 | 4 | 10 | 5 | 4 | 10 | 4 | 4 | 10 | 3 | 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Yds.* | *qr.* | *na.* | *E.Eng.* | *qrs.* | *na.* | *Yds.* | *qrs.* | *na.* | *E.Flem.* | *qrs.* | *na.* |
| 271 | 3 | 2 | 497 | 1 | 3 | 511 | 1 | 1 | 716 | 1 | 2 |
| 681 | 2 | 3 | 128 | 4 | 2 | 512 | 1 | 1 | 619 | 2 | 3 |
| 711 | 1 | 2 | 641 | 3 | 3 | 712 | 3 | 3 | 416 | 2 | 1 |
| 576 | 3 | 3 | 516 | 3 | 1 | 516 | 1 | 1 | 471 | 2 | 1 |
| 598 | 1 | 3 | 478 | 1 | 2 | 471 | 0 | 2 | 411 | 1 | 2 |
| 333 | 3 | 3 | 598 | 2 | 3 | 987 | 3 | 2 | 611 | 2 | 3 |
| 222 | 2 | 2 | 416 | 3 | 2 | 416 | 2 | 3 | 111 | 0 | 2 |
| 189 | 1 | 1 | 798 | 2 | 1 | 516 | 1 | 1 | 711 | 1 | 1 |
| 617 | 2 | 1 | 478 | 3 | 0 | 111 | 2 | 2 | 871 | 2 | 0 |

## OF DRY MEASURE.

| | | | |
|---|---|---|---|
| 2 Pints | *make* | 1 Quart | *Qts.* |
| 4 Quarts | —— | 1 Gallon | *Gall.* |
| 2 Gallons | —— | 1 Peck | *Pk.* |
| 4 Pecks | —— | 1 Buſhel | *Buſh.* |
| 8 Buſhels | —— | 1 Quarter of Corn | *Qr.* |
| 36 Buſhels | —— | 1 Chaldron of Coals | *C.* |

*Note,* This Meaſure is uſed in meaſuring all dry Goods, as Salt, Sand, Corn, Seeds, Seacoal, Charcoal, Smallcoal, Fruit, Roots, Oiſters, Cockles, and Muſcles.

*N. B.* In the Country 32 Buſhels make a Chaldron, and in *London* 36: Five Pecks go to a Buſhel.

## OF WATER MEASURE.

| | | |
|---|---|---|
| 1 Score of Coals | *make* | 21 Chaldron |
| 1 Sack of Coals | —— | 3 Buſhels |
| 1 Sack of Corn | —— | 4 Buſhels |
| 10 Quarters of Corn | —— | 1 Wey |
| 12 Weys | —— | 1 Laſt |
| 1 Load of Corn | —— | 5 Buſhels |
| 1 Cart Load | —— | 40 Buſhels |

The ſtandard Wincheſter Buſhel is a Cylinder, whoſe Diameter is eighteen Inches and an half, and eight Inches deep, and contains 2150 cubical Inches and 2-5ths.

EXAMPLES.

### EXAMPLES.

| 10 | 36 | 4 |
|---|---|---|
| *C* | *b* | *p* |
| 47 | 19 | 1 |
| 76 | 18 | 2 |
| 48 | 17 | 3 |
| 56 | 16 | 1 |
| 78 | 15 | 2 |
| 96 | 13 | 1 |
| 51 | 14 | 0 |
| 78 | 12 | 3 |
| 19 | 10 | 1 |

| 10 | 36 | 4 | 2 |
|---|---|---|---|
| *C* | *b* | *p* | *g* |
| 716 | 31 | 1 | 1 |
| 419 | 28 | 2 | 0 |
| 718 | 10 | 3 | 1 |
| 716 | 7 | 1 | 0 |
| 519 | 16 | 1 | 1 |
| 781 | 15 | 0 | 0 |
| 976 | 13 | 2 | 1 |
| 517 | 11 | 3 | 1 |
| 612 | 12 | 2 | 0 |

| 10 | 36 | 4 | 2 |
|---|---|---|---|
| *C* | *b* | *p* | *g* |
| 711 | 10 | 1 | 8 |
| 611 | 10 | 2 | 0 |
| 519 | 11 | 1 | 1 |
| 716 | 15 | 2 | 1 |
| 912 | 10 | 3 | 0 |
| 716 | 11 | 1 | 1 |
| 516 | 17 | 0 | 1 |
| 718 | 13 | 2 | 0 |
| 961 | 14 | 1 | 1 |

| 10 | 36 | 4 | 2 | 4 |
|---|---|---|---|---|
| *C* | *b* | *p* | *g* | *q* |
| 497 | 10 | 1 | 1 | 1 |
| 617 | 11 | 0 | 0 | 2 |
| 511 | 13 | 2 | 1 | 3 |
| 697 | 10 | 3 | 0 | 1 |
| 786 | 11 | 1 | 1 | 1 |
| 517 | 10 | 2 | 0 | 2 |
| 417 | 11 | 3 | 1 | 3 |
| 516 | 17 | 1 | 1 | 1 |
| 478 | 2 | 0 | 1 | 2 |

## OF LONG MEASURE.

| | | | |
|---|---|---|---|
| 3 Barley-Corns | *make* | 1 Inch | *In.* |
| 4 Inches | —— | 1 Hand | *Hand* |
| 12 Inches | —— | 1 Foot | *Ft.* |
| 3 Feet | —— | 1 Yard | *Yds.* |
| 6 Feet | —— | 1 Fathom | *Fthm.* |
| 5 Yards and an half | —— | 1 Rod, Pole, or Perch | *Rd. p.ph.* |
| 40 Poles | —— | 1 Furlong | *Flng.* |
| 8 Furlongs | —— | 1 Mile | *Ml.* |
| 3 Miles | —— | 1 League | *Lg.* |

This Meaſure is uſed in meaſuring the Diſtance of Places, where Length is required, and the Breadth not conſidered.

A Degree is commonly called 60 Miles, but is 69 and an half. A Pole, or Perch, are not always of the ſame Length; for in Fens and Wood-lands they generally reckon 18 Feet to the Pole, and for Foreſt 21 Feet; but the ſtatute Meaſure for a Pole or Perch is 5 Yards and an half. The Hand is uſed in meaſuring of Horſes, and a Fathom in taking of Depths.

EXAMPLES.

### EXAMPLES.

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | 3 | 8 | 10 | 3 | 8 | 40 | 10 | 3 | 12 | 3 | 10 | 3 | 12 | 3 |
| *Ls.* | *ml.* | *f.* | *Ls.* | *ml.* | *f.* | *pls.* | *Yds.* | *f.* | *in.* | *bc.* | *Yds.* | *f.* | *in.* | *bc.* |
| 711 | 1 | 7 | 611 | 1 | 6 | 17 | 571 | 1 | 10 | 1 | 711 | 1 | 10 | 1 |
| 511 | 2 | 6 | 519 | 2 | 7 | 36 | 611 | 2 | 9 | 0 | 611 | 2 | 11 | 2 |
| 612 | 1 | 6 | 511 | 0 | 5 | 19 | 716 | 1 | 11 | 1 | 718 | 1 | 9 | 1 |
| 787 | 0 | 5 | 716 | 1 | 6 | 17 | 571 | 2 | 10 | 2 | 617 | 1 | 6 | 2 |
| 517 | 2 | 4 | 519 | 2 | 3 | 16 | 611 | 1 | 9 | 0 | 519 | 0 | 5 | 1 |
| 615 | 1 | 3 | 617 | 1 | 4 | 11 | 718 | 0 | 8 | 1 | 333 | 1 | 4 | 0 |
| 498 | 1 | 2 | 519 | 0 | 5 | 18 | 516 | 1 | 7 | 0 | 468 | 0 | 0 | 2 |
| 716 | 2 | 1 | 316 | 1 | 2 | 13 | 314 | 0 | 6 | 2 | 576 | 2 | 2 | 1 |
| 578 | 0 | 0 | 781 | 2 | 1 | 19 | 791 | | 5 | 0 | 389 | 1 | 1 | 0 |
| 561 | 1 | 1 | 460 | 1 | 2 | 11 | 516 | 2 | 4 | 1 | 416 | 2 | 1 | 2 |

## Of LAND (or SQUARE) MEASURE.

| | | | |
|---|---|---|---|
| 144 Square Inches | *make* | 1 Square Foot | *S. Ft.* |
| 9 Feet | —— | 1 Yard | *Yds.* |
| 30 Yards and one Quarter | —— | 1 Pole | *Pole* |
| 40 Poles | —— | 1 Rood | *Rd.* |
| 4 Roods | —— | 1 Acre | *Acre* |
| 640 Acres | —— | 1 Mile | *Mle* |

*N. B.* This Meaſure gives the Content of any Piece of Land in Acres.

### EXAMPLES.

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | 4 | 40 | 10 | 4 | 40 | 10 | 4 | 40 | 10 | 4 | 40 |
| *A* | *r.* | *p.* | *A* | *r.* | *p.* | *A* | *r.* | *p.* | *A* | *r.* | *p.* |
| 27 | 3 | 11 | 511 | 2 | 17 | 161 | 1 | 19 | 411 | 1 | 17 |
| 19 | 2 | 17 | 612 | 1 | 10 | 161 | 2 | 20 | 516 | 2 | 18 |
| 69 | 3 | 18 | 516 | 3 | 11 | 781 | 3 | 22 | 987 | 1 | 19 |
| 78 | 1 | 11 | 781 | 1 | 19 | 611 | 0 | 23 | 31 | 3 | 17 |
| 65 | 0 | 19 | 976 | 2 | 17 | 987 | 2 | 24 | 987 | 0 | 16 |
| 38 | 1 | 28 | 678 | 3 | 16 | 516 | 3 | 25 | 615 | 1 | 15 |
| 79 | 2 | 31 | 548 | 0 | 15 | 419 | 1 | 26 | 419 | 0 | 13 |
| 51 | 3 | 17 | 716 | 2 | 13 | 111 | 2 | 18 | 711 | 2 | 14 |
| 61 | 1 | 11 | 419 | 1 | 10 | 128 | 3 | 17 | 311 | 3 | 19 |

# OF LIQUID MEASURE.

Of which there are two Sorts, *viz.* Wine Meaſure and Wincheſter Meaſure. Wincheſter is a particular Meaſure uſed for Beer, Ale, *&c.* And Wine Meaſure is uſed in meaſuring all Spirits, Strong Waters, Perry, Cyder, Mead, Honey, Oil, Vinegar, &c. And the Difference between Wine and Wincheſter Meaſure is, a Gallon of Wine is 231 ſolid Inches, but a Gallon of Beer or Ale contains 282 ſolid Inches.

## *Firſt,* Of WINE MEASURE.

| | | |
|---|---|---|
| 2 Pints — — | *make* | 1 Quart |
| 4 Quarts — — | | 1 Gallon |
| 10 Gallons — — | | 1 ~~Anchor of Rum or Brandy~~ |
| 18 Gallons — — | | 1 Runlet |
| 31 Gallons and one half | | 1 Barrel |
| 42 Gallons — — | | 1 Tierce |
| 63 Gallons — — | | 1 Hogſhead |
| 84 Gallons — — | | 1 Puncheon |
| 2 Hogſheads — — | | 1 Pipe or Butt |
| 2 Pipes, or 4 Hhds. | | 1 Tun |

### EXAMPLES.

| | | | |
|---|---|---|---|
| 10 | 4 | 63 | 4 |
| *T.* | *H.* | *G.* | *Q.* |
| 714 | 3 | 62 | 1 |
| 714 | 1 | 19 | 2 |
| 619 | 2 | 17 | 3 |
| 719 | 0 | 11 | 0 |
| 512 | 1 | 12 | 2 |
| 316 | 0 | 13 | 3 |
| 987 | 1 | 14 | 1 |
| 563 | 2 | 15 | 0 |
| 987 | 3 | 16 | 1 |

| | | | | |
|---|---|---|---|---|
| 10 | 2 | 2 | 63 | 4 |
| *T.* | *P.* | *H.* | *G.* | *Q.* |
| 511 | 1 | 1 | 19 | 1 |
| 612 | 0 | 1 | 17 | 2 |
| 719 | 1 | 1 | 16 | 3 |
| 614 | 3 | 0 | 13 | 2 |
| 987 | 0 | 0 | 14 | 1 |
| 516 | 1 | 0 | 10 | 2 |
| 619 | 0 | 1 | 11 | 3 |
| 819 | 1 | 1 | 12 | 1 |
| 716 | 0 | 0 | 28 | 2 |

| 10 | 4 | 63 | 4 |
|---|---|---|---|
| *T.* | *H.* | *G.* | *Q.* |
| 718 | 2 | 22 | 1 |
| 617 | 1 | 19 | 1 |
| 529 | 3 | 23 | 3 |
| 657 | 2 | 17 | 2 |
| 619 | 3 | 23 | 1 |
| 244 | 2 | 18 | 0 |
| 697 | 2 | 28 | 2 |
| 427 | 1 | 19 | 3 |
| 614 | 0 | 17 | 0 |

| 10 | 4 | 63 | 4 | 2 |
|---|---|---|---|---|
| *T.* | *H.* | *G.* | *Q.* | *Pints.* |
| 519 | 2 | 62 | 1 | 0 |
| 627 | 0 | 23 | 2 | 1 |
| 819 | 2 | 24 | 2 | 0 |
| 527 | 1 | 26 | 3 | 1 |
| 617 | 3 | 18 | 2 | 0 |
| 516 | 2 | 19 | 1 | 1 |
| 178 | 0 | 17 | 0 | 0 |
| 168 | 3 | 28 | 1 | 1 |
| 716 | 2 | 16 | 0 | 0 |

## *Second,* Of WINCHESTER MEASURE.

| | | |
|---|---|---|
| 2 Pints | *make* | 1 Quart |
| 4 Quarts | | 1 Gallon |
| 8 Gallons | | 1 Firkin of Ale |
| 9 Gallons | | 1 Firkin of Beer in *London.* |
| 2 Firkins | | 1 Kilderkin |
| 4 Firkins | | 1 Barrel |
| 1 Barrel and a half | | 1 Hogſhead of Beer |
| 2 Hhds. or 3 Barrels | | 1 Butt |

*N. B.* In all Places in *England,* but *London,* 34 Gallons make a Barrel of both Strong and Small Beer, and eight Gallons and an Half one Firkin.

| | | |
|---|---|---|
| A Barrel of Salmon, or Eels | *is* | 42 Gallons |
| A Barrel of Herrings | | 32 Gallons |
| A Keg of Sturgeon | | 4 or 5 Gallons |
| A Firkin of Soap | | 8 Gallons |

## EXAMPLES.

| 10 | 54 | 4 | 10 | 4 | 9 | 10 | 4 | 8 | 10 | 54 | 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Hhds.* | *Gl.* | *Qs.* | *B.B.* | *F.* | *Gl.* | *B.A.* | *F.* | *Gl.* | *Hhds.* | *Gl.* | *Qts.* |
| 716 | 19 | 1 | 516 | 1 | 7 | 416 | 1 | 7 | 471 | 19 | 1 |
| 618 | 51 | 3 | 519 | 1 | 6 | 519 | 1 | 7 | 512 | 53 | 2 |
| 526 | 17 | 1 | 781 | 2 | 5 | 619 | 2 | 6 | 498 | 41 | 3 |
| 781 | 16 | 0 | 614 | 3 | 4 | 517 | 2 | 5 | 716 | 36 | 1 |
| 567 | 15 | 2 | 716 | 1 | 3 | 427 | 0 | 4 | 527 | 17 | 0 |
| 497 | 13 | 3 | 498 | 0 | 1 | 512 | 1 | 2 | 498 | 18 | 2 |
| 917 | 12 | 1 | 716 | 2 | 0 | 617 | 0 | 3 | 716 | 15 | 3 |
| 819 | 10 | 1 | 516 | 3 | 1 | 193 | 2 | 2 | 319 | 13 | 1 |
| 716 | 19 | 0 | 416 | 1 | 0 | 417 | 3 | 1 | 471 | 10 | 0 |

## OF TIME.

60 Seconds ——— — *make* 1 Minute
60 Minutes ——— — *make* 1 Hour
24 Hours ——— — *make* 1 Day
7 Days ——— — *make* 1 Week
4 Weeks ——— — *make* 1 Month
13 Months, 1 Day & 6 Hours *make* 1 Common, or Julian Year

*N. B.* A Solar Year contains 365 Days, 5 Hours, 48 Minutes, and 57 Seconds, according to the beſt Computation.

To remember the Days contained in each Month, obſerve the following Verſe.

Thirty Days hath *September*,
*April*, *June*, and *November*;
All the reſt have thirty-one,
Except *February* alone,
Which hath but twenty-eight Days clear,
And twenty-nine ev'ry Leap Year.

### EXAMPLES.

| 10 | 4 | 7 | 24 |
|---|---|---|---|
| *M.* | *W.* | *D.* | *H.* |
| 517 | 1 | 1 | 19 |
| 171 | 2 | 1 | 16 |
| 511 | 3 | 1 | 17 |
| 571 | 1 | 2 | 15 |
| 611 | 2 | 6 | 19 |
| 917 | 1 | 5 | 17 |
| 416 | 0 | 4 | 15 |
| 419 | 1 | 3 | 16 |
| 311 | 0 | 2 | 13 |

| 10 | 4 | 7 | 24 | 66 |
|---|---|---|---|---|
| *M.* | *W.* | *D.* | *H.* | *M.* |
| 741 | 1 | 6 | 17 | 19 |
| 116 | 2 | 5 | 18 | 11 |
| 719 | 3 | 4 | 19 | 10 |
| 419 | 1 | 3 | 20 | 19 |
| 678 | 0 | 2 | 21 | 17 |
| 519 | 1 | 1 | 22 | 11 |
| 498 | 2 | 0 | 23 | 16 |
| 417 | 3 | 1 | 19 | 10 |
| 416 | 1 | 0 | 17 | 11 |

| 10 | 13 | 4 | 7 | 24 | 60 | 60 |
|---|---|---|---|---|---|---|
| *Y.* | *M.* | *W.* | *D.* | *H.* | *M.* | *S.* |
| 511 | 10 | 1 | 6 | 11 | 19 | 13 |
| 617 | 11 | 2 | 5 | 15 | 10 | 10 |
| 197 | 9 | 1 | 4 | 17 | 11 | 17 |
| 141 | 8 | 0 | 3 | 18 | 51 | 11 |
| 611 | 7 | 1 | 2 | 19 | 19 | 13 |
| 917 | 6 | 2 | 1 | 14 | 48 | 14 |
| 149 | 5 | 1 | 2 | 10 | 11 | 15 |
| 614 | 4 | 3 | 3 | 11 | 16 | 16 |
| 716 | 3 | 1 | 4 | 12 | 10 | 13 |

| 10 | 13 | 4 | 7 | 24 | 60 | 60 |
|---|---|---|---|---|---|---|
| *Y.* | *M.* | *W.* | *D.* | *H.* | *M* | *.S.* |
| 511 | 10 | 1 | 6 | 14 | 19 | 17 |
| 416 | 11 | 0 | 1 | 17 | 17 | 17 |
| 311 | 10 | 1 | 2 | 18 | 18 | 19 |
| 216 | 11 | 2 | 3 | 19 | 11 | 11 |
| 419 | 9 | 3 | 4 | 15 | 16 | 13 |
| 176 | 8 | 1 | 5 | 14 | 15 | 10 |
| 419 | 7 | 2 | 6 | 13 | 13 | 11 |
| 316 | 6 | 3 | 1 | 11 | 10 | 11 |
| 114 | 5 | 1 | 2 | 10 | 11 | 10 |

## Of MOTION.

| | | | |
|---|---|---|---|
| 60 Seconds | *make* | 1 Minute | ′ |
| 60 Minutes | | 1 Degree | ° |
| 30 Degrees | | 1 Sign | ″ |

12 Signs, or 360 Degrees, make the great Circle in the Heavens, called the Zodiac.

## EXAMPLES.

| 10 | 60 | 60 | 10 | 60 | 60 | 10 | 60 | 60 |
|---|---|---|---|---|---|---|---|---|
| ° | ′ | ″ | ° | ′ | ″ | ° | ′ | ″ |
| 14 | 10 | 11 | 49 | 48 | 17 | 49 | 17 | 19 |
| 61 | 19 | 10 | 61 | 11 | 18 | 57 | 10 | 11 |
| 78 | 42 | 11 | 41 | 15 | 16 | 49 | 16 | 14 |
| 14 | 17 | 10 | 49 | 18 | 11 | 31 | 14 | 19 |
| 91 | 16 | 16 | 36 | 11 | 12 | 47 | 11 | 10 |
| 78 | 19 | 13 | 48 | 16 | 13 | 61 | 14 | 19 |
| 48 | 21 | 14 | 49 | 15 | 16 | 47 | 11 | 13 |
| 39 | 27 | 11 | 41 | 13 | 14 | 51 | 17 | 10 |
| 41 | 29 | 15 | 97 | 14 | 20 | 41 | 10 | 11 |

## QUESTIONS to exerciſe ADDITION.

1. *A.* paid *B.* 372*l.* 12*s.* 9½*d.* and is ſtill indebted to *B.* 611*l.* 17*s.* 9½*d.* What was the firſt Debt?

2. A Perſon had eight Cheſts of Tea, two of which weighed 4 *C.* 2 *qr.* 1 *lb.* each; and the reſt weighed 17 Pounds more: What Quantity of Tea had he?

3. A Perſon ſaved one Year 17 Guineas and Nine-pence Halfpenny, and ſeven Years after he ſaved 19*l.* 1 Moidore, and 4¼*d.* What had he ſaved in the whole?

4. A Leaſe was granted in the Month of *May*, 1439, and was to continue 217 Years: In what Year did it ceaſe?

5. If a Perſon was born in the Year 1709, when will he be 59 Years old?

6. A Steward receives the following Sums of his Lord to pay the following Bills; 109*l.* 11*s.* 6*d.* to the Butcher; 90*l.* to the Baker; and 300*l.* 19*s.* 9*d.* to the Wine Merchant; and 60*l.* 11*s.* to pay the Servants Wages; I demand what he received in all?

*N. B.* To prove Addition, this is the Rule: Add the whole Sum up; then omit the top Line (or any other) and add all the reſt up into one Sum; then join the Line you omitted to this laſt Sum, and if it be the ſame as the Sum Total your Work is right; or elſe add the whole up twice, beginning one Time at the Bottom of your Sum, and the other at the Top, and ſo proceed; and if both the Additions are the ſame the Work is right.

# Of SUBTRACTION.

SUBTRACTION teaches to take a ſmall Number from a greater, and to know the true and exact Remainder or Difference betwixt them, of which there are two Sorts, Simple and Compound.

## 1ſt. Of Simple SUBTRACTION.

Simple Subtraction ſhews the Difference between any two Numbers of the ſame Denomination, as the Difference between ſeven Pounds and three Pounds is four Pounds.

*N. B.* The Numbers placed over the Sums ſhew at what you borrow, as they did in Addition, at what you carried.

### EXAMPLES.

| £ 10 | £ 10 | £ 10 | £ 10 | £ 10 |
|---|---|---|---|---|
| 47140 | 147411 | 161710 | 414701 | 5141614 |
| 12987 | 131928 | 140971 | 129876 | 4179828 |

| *Crowns* 10 | *Yards* 10 | *Hours* 10 |
|---|---|---|
| 4714141 | 71214212 | 41614161 |
| 1293292 | 12987658 | 12987649 |

## 2d. Of Compound SUBTRACTION.

Compound Subtraction ſhews the Difference between any two Sums of divers Denominations.

### Of MONEY.

### EXAMPLES.

|  | 10 | 20 | 124 | 10 | 20 | 124 | 10 | 20 | 124 |
|---|---|---|---|---|---|---|---|---|---|
|  | £. | *s.* | *d.* | £. | *s.* | *d.* | £. | *s.* | *d.* |
| Lent | 471 | 10 | 6½ | 412 | 10 | 6½ | 471 | 11 | 9½ |
| Recd. | 128 | 11 | 9¾ | 193 | 11 | 9¾ | 123 | 10 | 6¾ |
| Due | 342 | 18 | 8¾ |  |  |  |  |  |  |

| | 10 | 20 | 12 4 | 10 | 20 | 12 4 | 10 | 20 | 12 4 |
|---|---|---|---|---|---|---|---|---|---|
| | £. | s. | d. | £. | s. | d. | £. | s. | d. |
| Diſburſed | 511 | 11 | 7½ | 512 | 11 | 7¼ | 411 | 10 | 6½ |
| Received | 419 | 11 | 9¾ | 198 | 11 | 9¾ | 128 | 11 | 9¾ |
| Remains. | | | | | | | | | |

| | 10 | 20 | 12 4 | 10 | 20 | 14 4 | 10 | 20 | 14 4 |
|---|---|---|---|---|---|---|---|---|---|
| | £. | s. | d. | £. | s. | d. | £. | s. | d. |
| Borrowed | 511 | 10 | 11½ | 1000 | 0 | 0 | 400 | 11 | 6 |
| Paid — | 100 | 11 | 11 | - | - | ¾ | 114 | 11 | 9¾ |
| Unpaid — | | | | | | | | | |

| | 10 | 20 | 12 4 | 10 | 20 | 12 4 | 10 | 20 | 12 4 |
|---|---|---|---|---|---|---|---|---|---|
| | £. | s. | d. | £. | s. | d. | £. | s. | d. |
| Lent —— | 417 | 11 | 6¼ | 417 | 10 | 11½ | 411 | 11 | 6¼ |
| Received — | 198 | 12 | 7½ | 189 | 11 | 11¾ | 128 | 11 | 9½ |
| Remains due | | | | | | | | | |

| | 10 | 20 | 12 4 | | 10 | 22 | 12 4 |
|---|---|---|---|---|---|---|---|
| | £. | s. | d. | | £. | s. | d. |
| Borrowed — | 741 | 10 | 6½ | Received — | 714 | 16 | 5½ |
| Paid at ſeveral Payments | 47 | 11 | 7½ | Laid out at ſundry times | 47 | 11 | 3¼ |
| | 41 | 10 | 6¾ | | 49 | 10 | 6½ |
| | 19 | 19 | 7½ | | 49 | 11 | 11¼ |
| | 46 | 11 | 6¾ | | 67 | 13 | 10½ |
| | 56 | 17 | 1¼ | | 41 | 19 | 11¾ |
| | 92 | 19 | 9½ | | 41 | 10 | 10 |
| | 41 | 11 | 11¾ | | 72 | 6 | 11 |
| Paid in all — | | | | Laid out in all | | | |
| Remains due | | | | In hand —— | | | |

Of

## Of TROY.

| | 10 | 20 | 24 | 10 | 20 | 24 | 10 | 12 | 20 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|
| | *Oz.* | *dw.* | *gr.* | *Oz.* | *dw.* | *gr.* | *lb.* | *oz.* | *dw.* | *gr.* |
| Bought | 41 | 10 | 11 | 471 | 10 | 6 | 411 | 10 | 14 | 10 |
| Sold — | 19 | 11 | 12 | 121 | 11 | 7 | 128 | 11 | 14 | 11 |
| Unſold | | | | | | | | | | |

## Of AVOIRDUPOIS WEIGHT.

| | 10 | 20 | 4 | 28 | 10 | 20 | 4 | 28 | 10 | 20 | 4 | 28 | 16 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *T.* | *C.* | *q.* | *lb.* | *T.* | *C.* | *q.* | *lb.* | *T.* | *C.* | *q.* | *lb.* | *oz.* | *dr.* |
| From | 21 | 10 | 1 | 10 | 74 | 11 | 2 | 13 | 71 | 10 | 1 | 11 | 10 | 6 |
| Take | 19 | 11 | 3 | 11 | 19 | 11 | 3 | 18 | 12 | 11 | 2 | 11 | 11 | 9 |
| Differ. | | | | | | | | | | | | | | |

## Of APOTHECARIES WEIGHT.

| | 10 | 8 | 3 | 20 | 10 | 8 | 3 | 20 | 10 | 12 | 8 | 3 | 20 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ℥ | ʒ | Є | *gr.* | ℥ | ʒ | ℈ | *gr.* | *lb.* | ℥ | ʒ | ℈ | *gr.* |
| From | 41 | 1 | 1 | 17 | 41 | 1 | 2 | 11 | 71 | 2 | 0 | 1 | 11 |
| Take | 12 | 2 | 2 | 10 | 12 | 2 | 2 | 19 | 12 | 4 | 2 | 2 | 17 |
| Rem. | | | | | | | | | | | | | |

## Of CLOTH MEASURE.

| | 10 | 4 | 4 | 10 | 4 | 4 | 10 | 5 | 4 |
|---|---|---|---|---|---|---|---|---|---|
| | *Yds.* | *qrs.* | *nls.* | *Yds.* | *qrs.* | *nls.* | *Ells.* | *qrs.* | *nls.* |
| A Mercer bt. | 411 | 1 | 1 | 711 | 1 | 2 | 411 | 1 | 1 |
| Sold — | 122 | 2 | 2 | 121 | 2 | 3 | 192 | 2 | 2 |
| Unſold — | | | | | | | | | |

## Of DRY MEASURE.

| | 10 | 36 | 4 | 10 | 36 | 4 | 2 | 10 | 36 | 4 | 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Ch.* | *bu.* | *p.* | *Ch.* | *bu.* | *p.* | *gls.* | *Ch.* | *bu.* | *p.* | *gls.* |
| From | 711 | 10 | 1 | 412 | 11 | 2 | 1 | 714 | 10 | 1 | 2 |
| Take | 122 | 11 | 2 | 120 | 12 | 3 | 2 | 128 | 11 | 2 | 3 |
| Diff. | | | | | | | | | | | |

## Of LONG MEASURE.

| | 10 | 8 | 40 | 10 | 3 | 12 | 3 | 10 | 3 | 8 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Mls.* | *f.* | *p.* | *Yds.* | *ft.* | *in.* | *bc.* | *L.* | *m.* | *f.* | *p.* |
| From | 42 | 1 | 10 | 41 | 1 | 10 | 1 | 47 | 1 | 1 | 19 |
| Take | 19 | 2 | 11 | 12 | 2 | 11 | 2 | 18 | 2 | 2 | 21 |
| Diff. | | | | | | | | | | | |

## Of SQUARE MEASURE.

| | 10 | 4 | 40 | 10 | 4 | 40 | 10 | 4 | 50 |
|---|---|---|---|---|---|---|---|---|---|
| | *A.* | *r.* | *p.* | *A.* | *r.* | *p.* | *A.* | *r.* | *p.* |
| Bought | 411 | 1 | 11 | 711 | 2 | 10 | 512 | 3 | 11 |
| Sow'd | 187 | 2 | 12 | 118 | 2 | 11 | 128 | 3 | 19 |
| Unſow'd | | | | | | | | | |

## Of WINE MEASURE.

| | 10 | 4 | 2 | 10 | 4 | 63 | 4 | 10 | 4 | 63 | 4 | 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Gls.* | *qts.* | *pts.* | *T.* | *hs.* | *gls.* | *qts.* | *T.* | *hs.* | *gls.* | *qts.* | *pts.* |
| Bought | 14 | 1 | 1 | 511 | 1 | 11 | 1 | 412 | 1 | 19 | 2 | 1 |
| Sold | 17 | 2 | 3 | 128 | 2 | 11 | 2 | 124 | 2 | 10 | 3 | 2 |
| Unſold | | | | | | | | | | | | |

Of

## OF WINCHESTER MEASURE.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 10 | 54 | 4 | 10 | 4 | 9 | 10 | 4 | 8 |
| | *Hhds.* | *gls.* | *qts.* | *Bls.* | *f.* | *gls.* | *AB.* | *f.* | *gls.* |
| From | 411 | 10 | 1 | 47 | 1 | 2 | 41 | 2 | 1 |
| Take | 128 | 11 | 2 | 19 | 2 | 3 | 19 | 3 | 2 |
| Diff. | | | | | | | | | |

## OF TIME.

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10 | 13 | 4 | 7 | 10 | 7 | 24 | 60 | 60 | 10 | 24 | 60 | 60 |
| | *Y.* | *m.* | *w.* | *d.* | *W.* | *dys.* | *hrs.* | *m.* | *ſec.* | *D.* | *h.* | *m.* | *ſec.* |
| From | 711 | 10 | 1 | 6 | 411 | 6 | 17 | 19 | 22 | 411 | 12 | 17 | 31 |
| Take | 128 | 12 | 1 | 0 | 128 | 7 | 19 | 21 | 36 | 128 | 12 | 17 | 48 |
| Differ. | | | | | | | | | | | | | |

## OF MOTION.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 10 | 60 | 60 | 10 | 60 | 60 | 10 | 60 | 60 |
| | ° | ′ | ″ | ° | ′ | ″ | ° | ′ | ″ |
| From | 56 | 11 | 10 | 71 | 19 | 13 | 471 | 10 | 11 |
| Take | 51 | 19 | 42 | 27 | 48 | 52 | 228 | 22 | 29 |
| Diff. | | | | | | | | | |

*N. B.* The Proof of ſubtraction is done by adding the Money paid, to the remains, or Money owing; and the Sum will be the Money lent.

### QUESTIONS *to exerciſe* SUBTRACTION.

1. The Battle of *Boſworth*, in Leiceſterſhire, was fought betwixt *Richard* the Third and the Earl of *Richmond*, in the Year 1485, when *Richard* was defeated and ſlain: It happened 419 Years after the Conqueror began to reign. In what Year did the Conqueror begin to reign, and how long is it ſince the Death of Richard, this being the Year 1760?

2. A Perſon bought an Eſtate, valued at 4222*l.* 9*s.* 6½*d.* and his Caſh is, 2522*l.* 2*s.* 6½*d.* What Sum will he want to pay for the Eſtate?

3. What Sum of Money, added to 374*l.* 17*s.* 11½*d.* will make it One Thouſand Pounds?

4. A Gentleman had two Sons; to the eldeſt he left 7846*l.* 19*s.* 11*d.* and to the youngeſt 2974*l.* 11*s.* 6*d.* now a Relation has a mind to make the youngeſt Son's fortune equal to the eldeſt; what Sum muſt he give him?

5. A Merchant was indebted to ſeveral Perſons 29472*l.* 17*s.* but his Effects were valued at no more than 10000*l.* what Sum will he want to pay the ſaid Debts?

6. What Sum of Money added to 37*l.* 11*s.* 4½*d.* will make it 100*l.*

7. Two Perſons ſpeaking of their Money, one ſaid he had 11761*l.* 11*s.* 9*d.* and the other had 111000*l.* what was the Difference betwixt them?

8. What is the Difference betwixt twice eight and twenty Pounds and twice twenty-eight Pounds?

9. A Gentleman upon his going out of town, is informed by his Steward, that his Baker's Bill amounts to 47*l.* 11*s.* 9*d.* his Butcher's to 411*l.* 19*s.* 11½*d.* his Brewer's to 100*l.* his cornchandler's to 114*l.* 11*s.* 9*d.* his Draper's to 100 Guineas, and his Coachmaker's to 50; I demand what Money he muſt ſend to his Banker for, he having but 70*l.* 11*s.* 9*d.* in hand?

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# MULTIPLICATION,

IS a Rule, by which we find the Increaſe or Amount of any Number, being ſo many Times taken as there are Units in another Number; and this Increaſe, or Amount, is called the Product, the Rectangle, or the Plain; and the two Numbers producing are called the Factors, or one the Multiplicand, and the other the Multiplier. There are two Sorts of Multiplication, *viz.* Single and Compound.

## 1*ſt.* Of SIMPLE MULTIPLICATION.

Simple Multiplication is the Multiplying of any two Numbers together, without Regard to their Signification; as 6 Times 6 is 36.

*N. B.* The following Table muſt be learnt by Heart before you can proceed any farther.

## The MULTIPLICATION TABLE.

3 times 3 is 9
4—12
5—15
6—18
7—21
8—24
9—27

4 times 4 is 16
5—20
6—24
7—28
8—32
9—36

5 times 5 is 25
6—30
7—35
8—40
9—45

6 times 6 is 36
7—42
8—48
9—54

7 times 7 is 49
8—56
9—63

8 times 8 is 64
9—72

9 times—9 is 81

11 times 3 is 33
4—44
5—55
6—66
7—77
8—88
9—99

12 times 3 is 36
4—48
5—60
6—72
7—84
8—96
9—108

## SECTION I.

In the firſt Section of Multiplication it is to be minded, that the Factors be placed one under another; that is, Units muſt ſtand under Units, Tens under Tens, &c.

### EXAMPLES.

| | *Pounds.* | |
|---|---|---|
| Multiply | 2714 | This is called the Multiplicand |
| By — | 2 | This the Multiplier |
| £. | 5428 | This the Product. |

| *Guineas.* | *Crowns.* | *Minutes.* | *lb.* |
|---|---|---|---|
| 47426341 | 456741 | 5222622 | 4745226 |
| 4 | 5 | 6 | 7 |

47

| | | | |
|---|---|---|---|
| 479644 | 1147196 | 1474161 | 4976141 |
| 8 | 9 | 11 | 12 |
| | | | |

## SECTION II.

When the Multiplier conſiſts of more Figures than one, there muſt be as many Products as there are Figures in the Multiplier, the firſt Figure of every Product muſt be put under its Multiplier; then add all the Products together, and their Sum will be the true Product required.

### EXAMPLES.

| *£* | *Yds* | *pence* | *hrs.* |
|---|---|---|---|
| 13271 | 6715 | 54326 | 23456 |
| 13 | 15 | 78 | 87 |
| 172523 | 37996 | 4237428 | 2040672 |

| *Days* | *months* | *years* |
|---|---|---|
| 579467 | 9161411 | 4746141 |
| 474 | 679 | 768 |
| 274667358 | 6220598069 | 3645036288 |

| *letters.* | *books.* | *quarters.* |
|---|---|---|
| 4768411 | 59471411 | 6497141 |
| 987 | 4917 | 4976 |
| 4706421657 | 292420927887 | 32329773616 |

| *days.* | *minutes.* |
|---|---|
| 3619874 | 4497461 |
| 49764 | 56789 |
| 180139409736 | 255406312729 |

## SECTION III.

Obſerve in the following Examples, that ſuch Factors as have Cyphers at the Ends muſt be put under one another as if there were no Cyphers.

To multiply by 10, is only placing a Cypher to the Right Hand of the Multiplicand; and if you was to multiply by 100, you place two Cyphers; if by 1000, you place three; if 10,000, you place four, &c. ſo that to multiply by Unity, with any Number of Cyphers annexed, is only joining the Cyphers to the Right Hand of the Multiplicand.

The Cyphers placed at the End of both or either of the Factors are not to be obſerved till the laſt Product, and then the Number of Cyphers, which are annexed in both Factors, muſt be placed to it.

### EXAMPLES.

5714140
10

369744
100

4741411
1000

597100
890
531419000

5116000
19000
97204000000

4410000
190
837900000

4714000
197000
928658000000

94611000
791000
74837301000000

## SECTION IV.

Obſerve in the following Examples, that the Cyphers which ſtand between the Figures in the Multiplier muſt be placed down under itſelf, and then you proceed to multiply by the Figure which ſtands next to them on the Left Hand; let there be what Number of Cyphers ſoever in your Multiplier, put them down in the ſame Manner under themſelves.

```
   4790764          56784471
     17904             40907
-----------     -------------
85773838656     2322882355197
-----------     -------------

     47461411         90640741
       400967           490706
--------------   --------------
19030459584437   44477955463146
--------------   --------------
```

## COMPOUND MULTIPLICATION,

Or the Multiplication of Money, Weight, Meaſure, &c. is the multiplying of any Sum of diverſe Denominations by one common Multiplier; as will be ſhewn by the following Sections.

### SECTION I.

When the Multiplier is only one ſingle Figure, you muſt multiply as in common Multiplication; only remembering to carry one for every twelve in Pence, and one for twenty in Shillings, &c. as in Addition.

### EXAMPLES.

```
                           s.  d.
4 lb. of Tea, at   —       8   4½   per lb.
                               4
                   ------------
                £. 1  13   6   Anſwer.
                   ------------
```

6 Gallons of Rum at 6 *s.* 8½ *d. per* Gallon.
8 Hogſheads of Wine at 31 *l.* 11 *s.* 3 *d. per* Hogſhead.
9 Barrels of Ale at 10 *l.* 11 *s.* 0½ *d. per* Barrel.
10 Yards of Silk at 13 *s.* 11 *d. per* Yard.
11 Watches at 5 *l.* 5 *s.* 10 *d. per* Watch.
12 Saſhes at 1 *l.* 1 *s.* 11 *d. per* Saſh.

### SECTION II.

When the Multiplier is above twelve, you muſt multiply the given Price by two Factors, which, when multiplied together, will produce the given Factor or Multiplier. As ſuppoſe the given Factor is 24, you muſt multiply by 6 and by 4, or by 8 and by 3; they both anſwering the ſame End.

### EXAMPLES.

| | |
|---|---|
| 14 Yards of Cloth at 7*s.* 6*d.* $\frac{1}{2}$ *per Yd.* | *Anſwer* 5*l.* 5*s.* 7*d.* |
| 20 Yards of Lace at 10*s.* 11*d.* $\frac{1}{2}$ *per Yd.* | *Anſwer* 10*l.* 19*s.* 2*d.* |
| 28 Ells of Silk at 14*s.* 7*d. per Ell.* | *Anſwer* 20*l.* 8*s.* 4*d.* |
| 36 Gallons of Oil at 17*s.* 11*d.* $\frac{3}{4}$ *per Gal.* | *Anſwrr* 32*l.* 7*s.* 3*d.* |
| 48 Yds of Broad Cloth at 19*s.* 11*d.* $\frac{1}{2}$ *per Y.* | *Anſwer* 47*l.* 18*s.* |
| 60 Yds. of Lace at 11*s.* 11*d.* $\frac{1}{2}$ *per Yd.* | *Anſwer* 35*l.* 17*s.* 6*d.* |
| 66 Buſhels of Corn at 13*s.* 11*d.* $\frac{1}{2}$ *per Bu.* | *Anſwer* 46*l.* 1*s.* 3*d.* |
| 77 Firkins of Butter at 19*s.* 10$\frac{3}{4}$*per Firk.* | *Anſw.* 76*l* 11*s.* 11*d*$\frac{3}{4}$ |
| 88 Gallons of Rum at 10*s.* 11$\frac{1}{2}$ *per Gal.* | *Anſwer* 48*l.* 4*s.* 4*d.* |
| 90 Barrels of Ale at 1*l.* 1*s.* 2*d. per Bar.* | *Anſwer* 95*l.* 5*s* |
| 99 Barrels of Soap at 2*l.* 11*s.* 9*d. per Bar.* | *Anſwer* 256*l.* 3*s.* 3*d.* |
| 132 Hhds. of Beer at 14*l.* 6*s.* 7*d. per H.* | *Anſwer* 1891*l.* 9*s.* |
| 144 Yards of Lace at 3*l.* 11*s.* 6*d. per Yd.* | *Anſwer* 514*l.* 16*s.* |

## SECTION. III.

When the given Multiplier is ſuch, that when two Numbers are multiplied together they will not produce it, you muſt take any two Factors. which when multiplied together will come nigheſt the given Multiplier; as ſuppoſe the given Number is 47, you muſt multiply by nine and by five, and the given Price by two, and add it to the laſt Product.

### EXAMPLES.

| | |
|---|---|
| 39 Yards of Silk at 14*s* 7*d* $\frac{1}{4}$ per Yd. | *Anſwer* 28*l* 9*s* 6*d* $\frac{3}{4}$ |
| 47 Yards of Lace at 1*l* 19*s* 6*d* per Yd. | *Anſwer* 29*l* 16*s* 6*d* |
| 51 Barrels of Ale at 2*l* 11*s* 6*d* $\frac{1}{2}$ per B. | *Anſwer* 131*l* 8*s* 7*d*$\frac{1}{2}$ |
| 91 Butts of Ale at 11*l* 11*s* 6*d* per Butt. | *Anſwer* 1053*l* 6*s* 6*d* |
| 107 Yards of Lace at 1*l* 13*s* 6*d* per Yd. | *Anſwer* 179*l* 4*s* 6*d* |
| 143 Hhds. of Beer at 4*l* 11*s* 6*d* per Hhd. | *Anſwer* 654*l* 4*s* 6*d* |

## SECTION IV.

When the Multiplier is above 144 you muſt take the Parts (thus) Suppoſe the given Multiplier is 228, you muſt multiply the given Price by 10, which will produce the Price of 10, and that Product multiply by 10 alſo, which is the Price of 100; then multiply the Price of 100 by 2, which will be the Price of 200; then for the 28, you muſt multiply the Price of 10 by 2, and place it under the laſt Product; and Laſtly, the given Price by 8, and place it under the laſt Product; add all three together, and the Product will be the Price of 228 as required: Obſerve the ſame Method in the following Examples.

| | |
|---|---|
| 211 Yards of Lace at 17*s* 9*d*½ per Yd. | *Anſwer* 187*l* 14*s* 0*d*½ |
| 196 Yards of Cloth at 18*s* 11*d*½ per Yd. | *Anſw.* 185*l* 15*s* 10*d* |
| 391 Firkins of Butter at 14*s* 7*d* per Firk. | *Anſw.* 285*l* 2*s* 1*d* |
| 476 Barrels of Beer at 2*l* 11*s* 9*d* per Ba. | *Anſw.* 1231*l* 13*s* 0*d* |
| 513 Watches at 5*l* 7*s* 9*d* per Watch. | *Anſw.* 2763*l* 15*s* 9*d* |
| 698 Oaks at 7*l* 11*s* 9*d* per Oak | *Anſw.* 5296*l* 1*s* 6*d* |
| 998 Cwt. of Braſs at 5*l* 11*s* 6*d* per Cwt. | *Anſw.* 5563*l* 17*s* 0*d* |

## SECTION V.

In the Multiplying of Weights, Meaſure, *&c.* all that is to be obſerved, is to carry as you did in Addition, *viz.* One for every 28, at Pounds One for every 4 in Qrs. *&c. &c.* that being all the Difference between this Section and the former.

*Note*, For a Help to the Memory, I ſhall place what you are to carry at, upon the given Quantities as I did in Addition and Subtraction.

### EXAMPLES.

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10 | 12 | 20 | 24 | | | | | | | | | | | |
| | *lb* | *Oz* | *dwt* | *Gr.* | | | | | | *lb* | *Oz* | *dwt* | *Gr* | | |
| Multiply | 20 | 11 | 10 | 11 | | | by | 26 | *Anſwer* | 544 | 11 | 11 | 22 | | |
| | 10 | 20 | 4 | 28 | 16 | 16 | | | | | | | | | |
| | *T* | *C* | *Q* | *lb* | *oz* | *dr* | | | | *T* | *C* | *Qs* | *lb* | *oz* | *dr* |
| Multiply | 4 | 11 | 1 | 10 | 11 | 3 | by | 47 | *Anſwer* | 214 | 13 | 0 | 26 | 13 | 13 |
| | 10 | 12 | 8 | 3 | 20 | | | | | | | | | | |
| | *lb* | ℥ | ʒ | ℈ | *grs* | | | | | *lb* | ℥ | ʒ | ℈ | *grs* | |
| Multiply | 48 | 10 | 1 | 0 | 11 | | by | 39 | *Anſw.* | 1904 | 11 | 6 | 0 | 9 | |
| | 10 | 4 | 4 | | | | | | | | | | | | |
| | *Yds.* | *Qrs.* | *Nls.* | | | | | | | *Yds.* | *Qrs.* | *Nls.* | | | |
| Multiply | 271 | 1 | 2 | | | | by | 391 | *Anſw.* | 106107 | 2 | 2 | | | |
| | 10 | 36 | 4 | 2 | 4 | | | | | | | | | | |
| | *Chls* | *Bſh* | *Pk* | *Gls* | *Qrts* | | | | | *Chls* | *Bſh* | *Pk* | *Gls* | *Qrts* | |
| Multiply | 97 | 10 | 1 | 1 | 1 | | by | 78 | *Anſw.* | 7588 | 19 | 2 | 1 | 2 | |

10 3 8 40
*Lgs Ml Fg Pole* — *Lgs M F Pole*
Multiply 571 1 6 19 by 28 — *Anſw.* 16004 2 5 12

10 3 12 3
*Yds Ft Inch Bc* — *Yds Ft In. Bc*
Multiply 411 1 10 1 by 73 — *Anſw.* 30048 0 10 1

10 4 40
*Acr. Rds Pls* — *Acres R Pole*
Multiply 27 3 17 by 26 — *Anſw.* 724 1 2

10 4 63 4
*T Hhds Gls Qts* — *T Hhds Gs Qts*
Multiply 18 2 22 1 by 71 — *Anſw.* 1319 3 4 3

10 54 4
*Hhds Gals Qt* — *Hhds Gs Qts*
Multiply 16 19 1 by 94 — *Anſw.* 1537 27 2

10 13 4 7 24 60 60
*Yrs M W D H M S* — *Yrs M W D H M S*
Multiply 411 10 1 6 23 17 11 by 23 — *A.* 9471 7 1 6 7 35 13

10 60 60
° ′ ″ — ° ′ ″
Multiply 4 10 19 by 60 — *Anſw.* 250 19 0

*Note*, Multiplication and Diviſion mutually prove each other.

---

# DIVISION.

DIVISION is that by which we diſcover how many Times one Number (call'd the Diviſor) is contain'd in another (call'd the Dividend) and the Anſwer is call'd the Quotient, in this there are Things to be obſerved.

Firſt, to Seek,
Secondly, to Multiply,
Thirdly, to Subtract,
Sometimes after the laſt Subtraction there is a Remainder.

There are likewiſe two Sorts of Diviſion, *viz.* Simple and Compound.

## Of Simple DIVISION.

Simple Diviſion, is when the Diviſor and Dividend are made Choice of, no Regard being had to their Signification, as 72 divided by 9 Produces 8, which is as much as to ſay 9 is contain'd 8 Times in 72; there are likewiſe two Sorts of Simple Diviſion, *viz.* Short Diviſion and Long Diviſion.

## Of Short DIVISION.

Short Diviſion is only made uſe of when the Number does not exceed Twelve.

### Examples.

Dividend Quotient
Diviſor 2)7161413( 3580705 4)7161411( 5)7161414(
1 Remainder
6)7141611( 7)47151411( 8)7141614( 9)98765141(
10)7161417( 11)41719611( 12)71961471(

## Of Long DIVISION.

### SECTION I.

It is called Long Diviſion when the Diviſor is above Twelve. Being obliged for an Help to the Memory, to Multiply by one ſingle Figure at a Time, till you have Multiplied the whole Diviſor; (always beginning at the right Hand Figure) then you muſt Subtract that Product from the Dividend to find the Remainder, and ſo muſt be continued to every Quotient Figure.

*N. B.* If the Remainder is more than the Diviſor, it will go more Times by producing a higher Figure in the Quotient.

Examples.

### EXAMPLES.

Divide 3985 by 28,

```
           28)3985(142              142 Quotient
              28 √                   28 Divisor
              ----                  ----
              118                   1145
              112 √                 284
              ----                  ----
                65                  3985 Proof
                56 √                ----
              ----               N. B. The Remainder
Remainder        9 √             9 is brought in when
              ----               I multiply by 28.
              3985 Proof
```

The Proof of Diviſion is made by Multiplying the Quotient by the Diviſor, and adding that Product to the Remainder if any; which will produce the Dividend if your Work to be true. Or ifyou add all the ſeparate Products made in the Courſe of your Diviſion, by multiplying the Quotient Figure by the Diviſor aud the Remainder into one Sum, it will be the Dividend; as before I have marked the Remainder and the ſeveral Multiplications in the Courſe of the laſt Example, with this Mark √

```
37)7419141(      121)716121811(       98765)41714123451(
48)9719121(      276)319416141(       79147)61417121612(
57)4191217(      398)716 2345(       501716)47195121711(
68)41212345(     976)412161239(     2300761)519716141211(
79)7947161(     1234)71416 4211(     987651)67841234561(
89)71914213(    4371)41971,71612(    712137)4121711987651(
```

## SECTION II.

When there are Cyphers annexed to the Diviſor you muſt cut them off, and the ſame Number of Figures towards the right Hand in the Dividend muſt be cut off as there are Cyphers in the Diviſor, and annexed to the Remainder at laſt.

*Note*, To divide by 10; 100 or 1000. *&c.* is only to cut off from the Dividend ſo many Figures towards the right Hand, as there are Cyphers in the Diviſor; which will be a

Remainder, and thoſe on the left Hand of the Dividend will be the Quotient.

### EXAMPLES.

1|00)71414|14(     498|00)761414|71(
876|000)4971416|121(     987|000)416 41|000(

## Of COMPOUND DIVISION.

Compound Diviſion, is the dividing divers Denominations by one common Diviſor.

You muſt divide as in ſhort Diviſion, only remembring to to carry as you did in Addition; but for a Help to the Memory, I ſhall place what you carry at the Top of the given Sums.

### EXAMPLES.

10 20 12 4     10 12 20 24     10 4 28 10 10
*£ s d*     *lb oz P gr*     *C Q lb oz dr*
7)91 11 $7\frac{3}{4}$(     8)71 10 11 10(     9)10 1 10 1 3

10 12 8 3 20     10 4 4     10 36 4
*lb* ℥ ʒ ℈ *gr*     *Yds qr nl*     *C B P*
11)47 10 1 1 17(     7)411 1 1(     7)31 10 1(

10 8 40     0 54 4     10 13 4 7 24 60
*M F P*     *H G Qt*     *Y M W D H M*
6)411 1 36(     6)16 10 1(     12)41 1 1 1 6 10(

### QUESTIONS to exerciſe DIVISION.

1. Divide 150*l.* among 50 Sailors.

2. A Captain took a Prize worth 20,000*l.* the one third Part belonged to him, the reſt to be equally divided among the Sailors which were 180 in Number: What's each Man's Share?

3. Suppoſe at the taking of *Quebec*, 1759, there were 1000 Soldiers plundered the City of 3196*l*: What's each

common Man's Share, ſuppoſing there was 56 Officers amongſt them?

4. What's the Quotient of 71614181 divided by 9 and by 8?

5. Suppoſe in the late Subſcription for Cloathing of 2112 Priſoners of War, 21611*l.* was Subſcribed: What's each Man's Share?

6. A Privateer with 70 Hands on Board having been out upon a Cruize, took a Prize valued at 7000*l.* What's each Man's Share?

---

## Of REDUCTION.

REDUCTION Teaches how to bring a Number from one Denomination to another of the ſame Value, which is performed by Multiplication and Diviſion, and there are likewiſe two Sorts of Reduction, *viz.* Reduction Deſcending and Aſcending.

### 1. REDUCTION DESCENDING,

Is performed by Multiplication, as when great Names are to be brought into ſmall; as Shillings into Pence, or Pounds into Ounces, *&c.*

### Of MONEY.

EXAMPLES.

1. In 31 Pounds, how many Shillings, Pence and Farthings?

```
     31l.
     20 Shillings in one Pound
    ————
    620 Shillings in 31 Pound
     12 Pence in one Shilling
   ————
   7440 Pence in 31 Pounds
      4 Farthings in one Penny
  —————
  29760 Farthings in 31 Pound
  —————
```

2. In 376*l.* 17*s.* 11*d*$\frac{1}{2}$, how many Farthings? *Anſwer* 361822 Farthings.

3. How many Farthings are equal in Value, to one Thouſand Pounds? *Anſwer* 960000 Farthings.

4. In 976 Guineas 19*s.* and 7*d.* $\frac{1}{2}$: How many Farthings? *Anſw.* 984750 Farthings.

5. In 372 Moidores, 14*s.* 9*d* $\frac{1}{2}$, How many Farthings? *Anſwer* 482822 Farthings.

6. Change 7164 Marks into Farthings. *Anſw.* 4584960.

7. In 6742 half Crowns: How many Farthings? *Anſw.* 809040.

8. In 700 Guineas, How many Pence? *Anſwer* 136400.

9. In 500 Crowns, How many Farthings? *Anſw.* 120000.

10. How many Farthings in 2746 Nobles? *Anſw.* 878720.

11. In 2146 Pieces of Eight, each being in Value, 4*s.* and 6*d.* How many Farthings? *Anſwer* 463536.

12. How many Farthings are equal in Value to 376 Three Pound Twelves, 17*s.* and 9*d?* *Anſwer* 1300308.

## 2. REDUCTION Ascending,

Is performed by Diviſion, as when ſmall Names are to be brought into great, as Farthings into Pounds, &c. it being quite the reverſe of Reduction Deſcending.

### Examples.

1. In 29760 Farthings, How many Pence, Shillings and Pounds?

4)29760

12)7440 Pence

2|0)62|0 Shillings

31 Pounds

*Note,* This is the Proof of the firſt Queſtion in Reduction Deſcending.

2. In 40006 Pence, How many Guineas? *Anſwer* 158 Guineas 15*s.* 10*d.*

3. Change 10000 Farthings into Moidores. *Anſwer* 7 Moidore, 19*s*. 4*d*.

4. In 7116 Pence, How many Three Pound Twelves? *Anſwer* 8 and 17*s*. over.

5. In 2116 Shillings, How many Three Pound Twelves? *Auſwer* 29 and 28*s*. over.

6. Change 216171 Halfpence into Crowns. *Anſwer* 1801 2*s*. 1*d* $\frac{1}{2}$.

7. How many Pounds and Shillings are there in 7161 Farthings? *Anſwer* 7*l*. 9*s*. 2*d*. $\frac{1}{4}$.

8. Change 51617 Half Crowns into Pounds. *Anſwer* 6452*l*. 2*s* 6*d*.

9. Change 3141 Pence into Crowns. *Anſwer* 52*l*. 1*s*. 9*d*.

10. In 700*s*. how many Crowns and Pounds? *Anſwer* 140 Crowns and 35*l*.

11. How many Crowns are there in 1000 Farthings? *Anſwer* 4 Crowns and 10*d*. over.

12. In 878720 Farthings how many Nobles? *Anſwer* 2746 Nobles.

## REDUCTION Descending and Ascending,

Is performed both by Multiplication and Diviſion.

### Examples.

1. In 500 Crowns how many Guineas and Halfpence? *Anſwer* 119 Guineas 1*s*. over, Halfpence 60000.

2. In 70 Moidores, how many Guineas. *Anſwer* 90 Guineas.

3. Twenty Three Men earned 57*l*. 11*s*. 6*d*. what's that a piece? *Anſwer* 2*l*. 10*s*. 0*d*. $\frac{3}{4}$

4. How many Guineas, Crowns, Pence and Threepences are there in 50*l*. *Anſwer* 47 Guineas and 13*s*. over, 250 Crowns, 4000 Threepences and 12,000 Pence.

5. Reduce 80*l*. into Shillings, Guineas and Pence. *Anſ* 1600*s*. 76 *Guineas* and 4 over, 19200*d*.

6. How many Fivepences, Threepences and Guineas are there in 20 Moidores. *Anſwer* 25 Guineas and 15*s*. over, 1296 Fivepences, 2160 Threepences.

7. How many Pounds Sterling are there in 100 Marks? *Anſwer* 66*l*. 13*s*. 4*d*.

8. I

8. In 70 Three Pound Twelves, How many Guineas, Pounds, Shillings and Crowns? *Anſwer* 240 Guineas, 252*l.* 1008 Crowns, 5040 Shillings.

9. How many Guineas are there in 140 Nobles? *Anſwer* 44 Guineas 9*s.* 4*d.*

10. Reduce 1596 Pence, into Shillings, Groats and Crowns, and the Number of each equal? *Anſwer* 21.

11. *Cape Britain* was taken by the *Engliſh* Anno. 1759, at the Siege of which we will ſuppoſe there were 5116 Soldiers, and the Plunder of the City amounted to 3000*l.* what's each common Man's Share, ſuppoſing there were 30 Officers, and they were to have 10*l.* each out of it; *Anſwer* 10*s.* 6*d* ½ each Man.

12. A Gentleman diſtributed 60*l.* among 40 poor Houſekeepers, 13 of which were to have a Guinea each, and 14 of them one Guinea and a half each; and the Remainder was to be equally divided amongſt the reſt; What's each Share? *Anſwer* 1*l.* 17*s.* 4*d.* ½ each.

## Of TROY WEIGHT.

1. In 11*lb.* 10*oz.* 11*dwts.* How many Grains? *Anſwer* 68424 Grains.

2. In 21000 Grains of Silver, how many *lb?* *Anſwer* 3*lb.* 7*oz.* 15*dwt.*

3. In 3*lb.* 10*oz.* of Gold, how many Earings, each 10*dwts?* *Anſwer* 92 Earings.

4. In 10 Ingots of Silver, each 17*oz.* 10*dwts.* how many *lb?* *Anſwer* 14*lb.* 7*oz.*

5. In 19*lb.* of Silver, how many Buckles, each 10*oz.* and an half? *Anſwer* 21 Buckles and 150*dwts* over.

6. A Gentleman having 36*lb.* 10*oz.* of Silver, was minded to make it into Spoons of 3*oz.* each, how many muſt he have? *Anſwer* 147 Spoons and 1*oz.* over.

## AVOIRDUPOIS WEIGHT.

1. How many Pounds are there in 5*C.* 3*qs.* 17*lb.* of Sugar? *Anſwer* 661*lb.*

2. How many Hundreds, Quarters and Pounds are there in 4 Tons of Iron; *Anſwer* 80*C.* 320*qrs.* 8960*lb.*

3. In 9*C.* 0*qs.* 11*lb.* how many Oz. and Drams? *Anſwer* 16304*oz.* 260864 *ds.*

4. In 9 Tons of Iron, how many Half Hundreds, Quarters and Pounds, and of each an equal Number? *Anſwer* 237 and 15*lb.*

5. How many Oz. and Drams in 342 common Pounds of Silk? *Anſwer* 5472*oz.* and 87552 *ds.*

6. How many Great Pounds of Silk in 29785 Drams? *Anſwer* 77*lb.* 13*oz.* 9*ds.*

7. How many common Pounds of Silk are there in 570 great *lb?* *Anſwer* 855.

8. How many great Pounds of Silk in 753 common Pounds? *Anſwer* 502*lb.*

9. How many Parcels, each 7*oz.* are there in 14*lb.* of Cloves? *Anſwer* 32 Parcels.

9. How many Pounds in 7 Hhds. of Tobacco, each weighing neat 9 C 2*qrs.* 11*lb?* *Anſwer* 7525*lb.*

10. How many Fodders of Lead in 19 Pigs, each weighing 3 C 3*qrs.* 7*lb?* *Anſwer* 3 Fodders 15 *C* 2*qrs.* 15*lb.*

11. A Grocer having 19 *C* 3*qrs.* 17*lb.* of Sugar to make into Parcels of 14*lb.* 12*lb.* and 9*lb.* and of each an equal Number, howmany muſt he have? *Anſwer* 63 *Parcels* 24*lb.*

*Note*, There are two Sorts of Pounds uſed in weighing of Silk, *viz.* Great Pounds and common Pounds, as all Raw, a Short, Long *China* and *Morea* Silk, *&c.* are weighed by great Pound of 24 Ozs. But Sleeve Silk, Ferret, Filoſella, *&c.* by the common Pound of 16 Ozs.

To Reduce common Pounds into great, Multiply by 2, and divide by 3.

To Reduce great Pounds into common, Multiply by 3, and divide by 2.

## APOTHECARIES WEIGHT.

*lb.* ℥ ʒ ℈ *grs.*
1. How many Grains are there in 9 7 3 1 14? *Anſwer* 55414 Grains.

2. How many *lb.* ℥. ʒ. ℈. *grs.* are there in 74520 Grains?
*lb.* ℥ ʒ ℈ *grs.*
*Anſwer* 2 11 2 0 0.

*lb.* ℥ ʒ ℈ *grs*
3. A Chemiſt having 1 9 3 2 8 of Powder, was minded to make it into Medicines of 16 Grains each, how

many muſt he have, ſuppoſing he was deſirous of having an equal Number of each Sort? *Anſwer* 644 and 4 *drs.* over.

## CLOTH MEASURE.

1. How many Quarters and Nails are there in 40 Yards of Cloth? *Anſwer* 160 *qrs.* and 640 *nls.*

2. In 20 Pieces of Cloth, each 25 Yards, how many Quarters and Nails? *Anſwer* 2000 *qrs.* and 8000 *nls.*

3. In 400 Nails, how many Yards? *Anſwer* 25 *yds.*

4. In 3000 Nails, how many *Engliſh* and *Flemiſh* Ells? *Anſwer* 150 *Engliſh* Ells and 250 *Flemiſh* Ells.

5. In 70000 Nails, how many Bales, each 10 Pieces, each 20 Yards? *Anſwer* 21 *Bales*, 8 *Pieces*, 15 *Yards.*

6. In 70 Bales of *Smyrna* Silk, each 11 Pieces, each 30 Yards, how many *Engliſh* Ells, Quarters and Nails? *Anſwer* 18480 *Engliſh* Ells, 92400 *qrs.* 369600 *nls.*

## DRY MEASURE.

1. How many Buſhels and Pecks of Wheat are there in 36 Quarters? *Anſwer* 288 *bſh.* 1152 *pks.*

2. In 1790 Pecks, how many Quarters of Barley? *Anſwer* 55 *qrs.* 7 *bſhs* 2 *pks.*

3. How many Pecks in 42 Chaldron of Coals, each 36 Buſhels? *Anſwer* 6048 *pks.*

4. How many Chaldron of Coals in 8790 Pecks? *Anſwer* 61 *qrs.* 1 *bſhl.* 2 *pks.*

## LONG MEASURE.

1. How many Miles and Leagues are in 964800 Inches? *Anſwer* 5 *Leagues* 15 *Miles* and 400 *yds.* over.

2. How often will a Wheel 17 Feet 6 Inches round turn in 100 Miles? *Anſwer* 30171$\frac{3}{7}$.

3. In 90 Miles, how many Yards, Poles and Furlongs? *Anſwer* 720 *Furlongs*, 28800 *Poles*, 158400 *Yards.*

4. How many Feet, Inches and Barly-corns are there in 50 Yards? *Anſwer* 150 *Feet*, 1800 *Inches* and 5400 *Barly-corns.*

5. How many Inches will make a Mile in Length? *Anſwer* 63360 *Inches.*

6. How many Inches and Barly-corns in 1 League? *Anſwer* 190080 *Inches* 570240 *Barly-corns.*

7. How many times oftener will a Wheel that is 10 Feet

10 Inches round turn, than another that is 19 Feet 9 Inches, between *London* and *Lincoln*, taking the Diſtance at 120 Miles? *Anſwer* 20660.

## LAND (or ſquare) MEASURE.

1. How many Roods and Perches are there in 20 Acres? *Anſwer* 80 *Rood* and 3200 *Perches*.

2. How many Perches are there in 11 Acres, 3 Roods, 17 Poles? *Anſwer* 1897 *Perches*.

3. A Farmer bought a Field that contain'd 14 Acres, 3 Rood, 7 Poles; but he was minded to take an Incloſure of 7 Acres out of it, how many Perches were there in the Remainder? *Anſwer* 1247 *Perches*.

4. In 7890 Perches how many Acres? *Anſwer* 49 *Acres*, 1 *Rood*, 10 *Perches*.

5. A Gentleman being deſirous to Incloſe three Fields, the firſt containing 9 Acres 2 Rood, the ſecond 11 Acres, 1 Rood, 7 Poles, and the third 8 Acres, 1 Rood, 12 Poles, how many Shares of 86 Perches each are contained in the whole? *Anſwer* 54 *Shares*, 15 *Perches* over.

## LIQUID MEASURE.

1. How many Gallons, Quarts and Pints are there in a Pipe of Wine? *Anſwer* 126 *Gallons*, 504 *Quarts*, 1008 *Pints*.

2. How many Quarts, Pints and half Pints are there in 20 Gallons of Ale? *Anſwer* 80 *Quarts*, 160 *Pints*, 320 *half Pints*.

3. How many Barrels of Beer are there in 96 Hogſheads? *Anſwer* 144 *Barrels*.

4. How many Gallons of Beer are there in a Copper that holds 18 Hogſheads? *Anſwer* 972 *Gallons*.

5. How many Gallons, Quarts, and Pints are there in 7 Tons of Oil? *Anſwer* 1764 *Gallons*, 7056 *Quarts*, 14112 *Pints*.

6. How many Pipes of Wine are there in 7892 Gallons? *Anſwer* 62 *Pipes* and 80 *Gallons* over.

7. In a Puncheon of Rum, how many Quarts and Pints, and of each an equal Number? *Anſwer* 224.

8. A Gentleman being minded to bottle off 2 Hogſheads of Mountain Wine, into Bottles of 2 Quarts, Quarts and

Pints, and to have an equal Number of each, how many muſt he have? *Anſwer* 144.

### Of TIME.

1. How many Days are there in 708560 Seconds? *Anſwer* 8 *Days*, 4 *Hours*, 49 *Minutes*, 20 *Seconds*.

2. How many Days Hours and Minutes are there in three Months, each 30 Days? *Anſwer* 90 *Days*, 2160 *Hours*, 129600 *Minutes*.

3. How many Minutes ſince the Birth of *Chriſt*, this being the Year 1760, accounting the common *Julian* Year? *Anſwer* 925689600 *Minutes*.

4. In 789644 Minutes how many Weeks? *Anſwer* 78 *Weeks*, 2 *Days*, 8 *Hours*, 40 *Minutes*.

5. In 365 Days, 6 Hours, (a *Julian* Year,) how many Minutes and Seconds? *Anſwer* 525960 *Minutes* and 31557600 *Seconds*.

6. How many Days from *April* 10 to *November* 2? *Anſwer* 205 *Days*.

### Of MOTION.

The Sun makes its Progreſs through the 12 Signs of the Zodiac, in a Year's Time, each Sign being 30 Degrees, in how many Minutes and Seconds doth ſhe complete her Courſe? *Anſwer*, 21600 *Minutes* 1296000, *Seconds*.

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## Of the RULE of THREE DIRECT.

THIS is called the Golden Rule, it being the moſt excellent and uſeful Rule of all the Rules in Arithmetic.

This teaches the Reſolution of any Analogy or Proportion; that is, it ſhews how, by having three Numbers given, to find a fourth that ſhall bear the ſame Proportion to the third, that the ſecond doth to the firſt.

### Of the DIRECT PROPORTION.

*Rule*, Mind in ſtating your Queſtion, that the firſt Number and third be of one Name, then multiply the ſecond and third together, and divide that Product by the firſt Number, and the Quotient is of the ſame Name as your middle Term; and the Anſwer to your Queſtion.

## EXAMPLES.

1. If 7 Yards of Holland coſt *2l.* 14*s.* 4*d* $\frac{3}{4}$, what will 74 Yards of the ſame coſt?

£. *s.* *d.*
2 14 4 $\frac{3}{4}$
20

54 Shillings
12

652 Pence
4

2611 Farthings

Now the Queſtion is fit for ſtating by this Reduction; and will ſtand thus:

*Yds.* *qrs.* *Yds.*
If 7 2611 74
74

10444
18277

7) 193214

17602 Farthings, and Anſwer to the Queſtion; and by reducing the Fathings into Pounds, *&c.* by the Rule given in Reduction, you will find it to be *28l.* 15*s.* 0*d.* $\frac{1}{2}$.

Obſerve this in all the following Queſtions.

2. If 6 Yards $\frac{1}{2}$ of Cloth coſt *2l.* 14*s.* *2d.* what will 764 $\frac{3}{4}$ Yards of the ſame Cloth coſt?

Reduce the Yards into Quarters, and the Pounds, *&c.* into Pence, and the Stating will ſtand thus:

*Qrs.* *d.* *Qrs.* *l.* *s.* *d.*
If 26 650 3059 *Anſwer* 318 12 11

If

3. If 764 $\frac{3}{4}$ Yards coſt 318*l.* 12*s.* 11*d.* what will 6 $\frac{1}{2}$ Yards of the ſame coſt? *Anſwer* 2*l.* 14*s.* 2*d.*

4. If a Perſon ſpends 4*l.* 15*s.* 1*d.* in 7 Days, what will he ſpend in a Year, or 365 Days? *Anſwer* 247*l.* 17*s.* 11*d.*

5. If one Yard of Cloth coſt 3*s.* 9*d.* what will 975 $\frac{3}{4}$ Ells *Engliſh* coſt? *Anſwer* 228*l.* 13*s* 1*d* $\frac{1}{2}$.

6. If 975 $\frac{3}{4}$ Ells *Engliſh* coſt 228*l.* 13*s.* 1*d.* $\frac{1}{2}$, what will one Yard of the ſame coſt, *Anſwer* 0*l.* 3s. 9*d.*

7. If 1 $\frac{1}{2}$ Gallon of Wine coſt 8*s.* 10*d.* $\frac{1}{2}$, what will 35 Hogſheads, 27 Gallons, 5 Pints and $\frac{1}{2}$ coſt? *Anſwer* 660*l.* 10*s.* 0*d.* $\frac{3}{4}$ and $\frac{6}{24}$ of a Farthing.

8. If one hundred weight of Sugar coſt 2*l.* 1*s.* 6*d.* what will 897*C.* 3*qrs.* 21*lb.* coſt at that Price? *Anſwer* 1863*l.* 4*s.* 4*d.* $\frac{1}{4}$ $\frac{1}{2}$.

9. If 4 Yards of Cloth coſt 29*s.* what is the Value of 496 Flemiſh Ells? *Anſwer* 134*l.* 17*s.*

10. If 2 Yards of Cloth coſt 14*s.* what coſt 100 *Engliſh* Ells? *Anſwer* 43*l.* 15*s.*

11. If a Box of Candles weighs 2*C.* 1*qr.* 19*lb.* what do they come to at 7*s.* 8*d.* per Dozen? *Anſwer* 8*l.* 13*s.* 1*d* $\frac{1}{2}$ $\frac{2}{3}$.

12. What comes a Hhd. of Wine to, when the Anchor is ſold for 4*l.* 10*s.* *Anſwer* 28*l.* 7*s.*

13. I gave 11*l.* 9*s.* 6*d.* for 4 Boxes of Candles, what do they weigh at 7*d.* per *lb.* *Anſwer* 390*lb.* $\frac{4}{7}$.

14. Bought 2 Hhds of Sugar for 63*l.* 11*s.* 8*d.* what do they weigh at 6*d.* $\frac{1}{2}$ per *lb.* *Anſwer* 20*C.* 3*qrs.* 23*lb.* and 11*oz.* $\frac{1}{13}$

15. If 89*l.* 11*s.* be paid by the Inſurers of a Ship at 3$\frac{1}{2}$*l.* per *Cent.* I demand how much is inſured on her? *Anſwer* 2558*l.* 11*s.* 5*d.* $\frac{1}{7}$

16. If at 2 $\frac{1}{4}$ per Cent. my Factor's Commiſſion comes to 36*l.* 11*s.* 9*d.* I demand what I have dealt for through his Order? *Anſwer* 1626*l.* 2*s.* 2*d.* $\frac{1}{2}$ $\frac{2}{3}$.

17. Suppoſe I gave 4*s.* 6*d.* per Ell *Engliſh* for 30 Pieces of *Iriſh* Cloth, which coſt me in all 169 Guineas; how many Ells were there in each Piece? *Anſwer* 26 Ells and 8 Ells over $\frac{2}{3}$.

18. A Gentleman is able to ſpend 1*l.* 15*s.* 4*d.* per Day, and lays up at the Year's end 800*l.* to purchaſe with, pray what was his yearly Income? *Anſwer* 1444*l.* 16*s.* 8*d.*

19. If the Expences of the People in the City of *London*

and *Weſtminſter* be 59520*l.* per Day, how much will keep them a Year and a Quarter? *Anſwer* 27156000*l.*

20. If 1 Skin coſt 8*d.* ½, what's the Value of 18 Score, 7 Dozen and 9 Skins? *Anſwer* 16*l.* 0*s.* 10*d.* ½.

21. A Tradeſman hath owing him 150*l.* and his Debtor doth agree to pay him 12*s.* 6*d.* for every Pound, the Queſtion is, what he muſt pay him for the whole, and what he muſt loſe by his Abatement? *Anſwer* he muſt pay him 93*l.* 15*s.* and he muſt loſe 56*l.* 5*s.*

22. My Partner at *Jamaica* informs me, there is made of the Sale of 150 Dozen of Shoes, 97*C.* 3*qrs.* 10*lb.* of Sugar, how much of the ſaid Sugar may my Partner lay Claim to for 93 Dozen that was his? *Anſwer* 60*C.* 2*qrs.* 18*lb.* nearly.

23. A Gentleman having a Parcel of old Houſes to diſpoſe of for 212*l.* per Annum, for 11 Years and 3 Quarters Purchaſe, what do they Amount to? *Anſwer* 2491*l.*

24. A Mercer ſold 40 Pieces of Silk for 726*l.* 12*s.* 6*d.* by which he gained as much as one Piece coſt him, I demand the Price of that Piece? *Anſwer* 18*l.* 3*s.* 3*d.* ½.

25. A Draper paid 297*l.* 16*s.* for a parcel of Cloth and found that it ſtood him in 2*s.* 6*d.* per Ell Flemiſh, what Quantity of Cloth did he buy in? *Anſwer* 2382 Ells Flemiſh ⅖.

26. A Sailor having been on board a Man of War from the 15th of *October* 1754, to the 25th of *June* 1758, what comes his Wages to at 1*l.* 10*s.* 6*d* per Month? *Anſwer* 67*l.* 19*s.* 5*d.* ⅐.

27. A Plumber bought 240 Fodder of Lead at 1*d.* ¾ per *lb.* what did the whole Quantity coſt him? *Anſwer* 3822*l.*

28. My Walking-ſtick, 45 Inches and ¼ long, gives a Shadow 49 Inches ½, I likewiſe meaſured the Shadow of a Tree and found it to be 249 Feet, 6 Inches, I demand the Height of the Tree? *Anſwer* 228 Feet.

29. What Length of a Board that's 2 Inches ½ thick and 7 ¾ broad is equal to a ſolid Foot? *Anſwer* 89 Inches $\frac{20}{155}$.

30. Bought 21 Pieces of Lace, each 27 Yards, at 3*s.* 9*d.* ½ per Ell Flemiſh, how much is the Value of the whole? *Anſwer* 143*l.* 6*s.* 6*d.*

31. If a Builder pays to Workmen 17 Guineas every 4 Weeks, how many Days will 100 Guineas pay them? *Anſ.* 141 Days $\frac{3}{17}$.

32. Suppoſe a Gentleman's yearly Salary was 150*l.* per Annum, how much may he ſpend per Day to lay up 20 Guineas at the Year's end? *Anſwer* 7*s.* 0*d.* $\frac{3}{4}$ $\frac{21}{73}$.

33. Bought 27 Pieces of Holland, each containing 24 Yards $\frac{3}{4}$ for 145*l.* 17*s.* 9*d.* what's the Value of one Flemiſh Ell? *Anſwer* 3*s.* 3*d.* $\frac{1}{4}$. $\frac{55}{297}$.

34. A Hop Merchant clears 20 per Cent. by ſelling Hops at 3*l.* 18*s.* per Cwt. but they growing ſcarcer he raiſed them to 4*l.* 7*s.* per Cwt. what does he gain per Cent. by vending them at the latter Price? *Anſwer* 33*l.* 16*s.* 11*d.* $\frac{1}{13}$.

35. A Merchant imported 12 Tuns of Wine at 9 Guineas per Ton, and paid for Freight 29*l.* 10*s.* for Cuſtom 32*l.* 5*s.* Loading, Unloading, and Cartage, 5*l.* 4*s.* 6*d.* the Queſtion is what this Wine ſtood him in per Gallon? *Anſwer* 1*s.* 2*d.* $\frac{1}{4}$. $\frac{1}{12}$.

36. Suppoſe I reckon my Expences to be 3*l.* 5*s.* per Week, out of an Income of 230*l.* 14*s.* 9*d.* per Annum: how much can I lay up at the Year's end? *Anſwer* 61*l.* 14*s.* 9*d.*

37. A Goldſmith bought a Wedge of Gold which weigh'd 13*lb.* 4*oz.* 8*dwt.* 9*grs.* for 472*l.* 10*s.* how much did he pay per Ounce? *Anſwer* 2*l.* 18*s.* 10*d.* $\frac{3}{4}$ $\frac{46173}{77001}$.

## The RULE of THREE REVERSE.

Is that by which from three Numbers given, we find a fourth in a reciprocal Proportion, inverted to the Proportion given.

The Analogy is, as the firſt Term is to the third, ſo is the ſecond to the fourth. And as the ſecond is to the third, ſo is the firſt to the fourth.

*Rule*, When you have ſtated your Queſtion, multiply the firſt and ſecond Terms together for a Dividend, and divide by the third, and the Quotient is the Anſwer.

EXAMPLES.

## EXAMPLES.

1. If 32 Men build a Houſe in 48 Days, in how Days will 64 Men do the ſame.

```
    Men          Days          Men
If  32 ———————— 48 ———————— 64
    48            64|1536 |24
  ————                |128  |
   256            ————————
  128               . 256                Anſ. 24 Men.
  ————                256             ———————————
  1536              ————————
  ————
```

Now the more Men being employed, they conſequently require the leſs Time. And this is when more require leſs.

2. If 64 Men build a Houſe in 24 Days, in how many Days will 32 Men do the ſame? *Anſwer* 48 Days.

Now as the leſs Number of Men being employed they will require the more Time. And this is when leſs require more, and is a Proof of the former Queſtion.

3. If (according [illegible] the Standard Statute or Law of *England*) the Penny Loaf muſt weigh, when Wheat is at 5 Shillings the Buſhel 7 *oz.* 7 *dwt.* Troy, or 8 *oz.* Avoirdupois, how much muſt it weigh when Wheat is 2*s.* 6*d.* per Buſhel? *Anſwer* 1 *lb.* 2 *oz.* 14 *dwts.* Troy, or 1 *lb.* Avoirdupois.

4. How many Yards of Shalloon that is Ell wide will line 140 Yards of Cloth, 3 Quarters wide? *Anſwer* 84 Yards.

5. A Perſon has a Room 24 Feet long and 18 broad, the Top of which he would hang with Paper of 18 Inches broad, how many Yards of Paper muſt he have to compleat his Room? *Anſwer* 96 Yards.

6. Suppoſe one lends 1200 Pounds 12 Months, how much muſt be lent 72 Months to requite the former Favour? *Anſ.* 200 Pounds.

7. Suppoſe a Building was raiſed in 16 Months by 240 Men, and another of the ſame Model is required in 4 Months, How many Men muſt be employed to compleat the ſame? *Anſwer* 960 Men.

8. Suppoſe a Garriſon of 2400 Soldiers, and their Proviſions were computed to laſt them 4 Months, how many muſt be ſent away that the Proviſions may be ſufficient for the remaining 16 Months? *Anſwer* 1800.

9. If a Field will graze 24 Horſes 9 Weeks, how many Horſes will it graze 36 Weeks? *Anſwer* 6 Horſes.

10. The Carriage of 2400 Pounds Weight 72 Miles coſt 2*l.* 8*s.* how many Pounds Weight ſhall I have carried 216 Miles for the ſame Money? *Anſwer* 800 Pounds Weight.

11. A Cyſtern has three Cocks, which will empty it in 48 Hours, how many Cocks of the ſame Bore will empty it in 6 Hours? *Anſwer* 24 Cocks.

12. If When Beer is 74 Shillings per Butt, 24 Shillings worth will ſerve 288 Men, how many Men will the ſame 24 Shillings worth ſerve when Beer is 5*l.* 8*s.* per Butt? *Anſwer* 198 Men.

13. If 24 Men finiſh a Peice of Work in 24 Hours, how many Men would finiſh the ſame in 3 Hours? *Anſwer* 192 Men.

14. If a Perſon performs a Journey of 908 Miles in 32 Days, when the Days are 16 Hours long, how many Days will it require of him when the Days are but 12Hours long. *Anſwer* 42 Days and 16 Hours.

## PRACTICE,

IS when the firſt Term is an Integer, *viz.* If one Yard, Pound, Ounce, &*c.* coſt 3*s.* 4*d.* (or any Thing) what will 24 Yards, Pounds, Ounces, &*c.* coſt? This is commonly called Practice, from the great Uſe and Practice of it in common Affairs and may be reſolved by Operations more ſpeedy and practical then thoſe of the Rule of Three.

*Note*, Before I proceed I ſhall give a Table of Aliquot (or even Parts) of a Pound Sterling, which muſt be learnt by Heart, being of grear Uſe in this Rule.

| s. | d. | |
|---|---|---|
| 10 | 0 | $\frac{1}{2}$ of a Pound |
| 6 | 8 | $\frac{1}{3}$ |
| 5 | 0 | $\frac{1}{4}$ |
| 4 | 0 | $\frac{1}{5}$ |
| 3 | 4 | $\frac{1}{6}$ |
| 2 | 6 | $\frac{1}{8}$ |
| 2 | 0 | $\frac{1}{10}$ |
| 1 | 8 | $\frac{1}{12}$ |
| 1 | 4 | $\frac{1}{15}$ |
| 1 | 3 | $\frac{1}{16}$ |
| 1 | 0 | $\frac{1}{20}$ |
| 0 | 10 | $\frac{1}{24}$ |
| 0 | 8 | $\frac{1}{30}$ |
| 0 | $7\frac{1}{2}$ | $\frac{1}{32}$ |
| 0 | 6 | $\frac{1}{40}$ |
| 0 | 5 | $\frac{1}{48}$ |
| 0 | 4 | $\frac{1}{60}$ |
| 0 | $3\frac{3}{4}$ | $\frac{1}{64}$ |

| s. | d. | |
|---|---|---|
| 0 | 3 | $\frac{1}{80}$ |
| 0 | $2\frac{1}{2}$ | $\frac{1}{96}$ |
| 0 | 2 | $\frac{1}{120}$ |
| 0 | $1\frac{1}{2}$ | $\frac{1}{160}$ |
| 0 | $1\frac{1}{4}$ | $\frac{1}{192}$ |
| 0 | 1 | $\frac{1}{240}$ |
| 0 | $0\frac{1}{2}$ | $\frac{1}{480}$ |
| 0 | $0\frac{1}{4}$ | $\frac{1}{960}$ |

The even Parts of a Shilling.

| | | |
|---|---|---|
| 6 | Pence is | Half |
| 4 | is | $\frac{1}{3}$ |
| 3 | is | $\frac{1}{4}$ |
| 2 | is | $\frac{1}{6}$ |
| $1\frac{1}{2}$ | is | $\frac{1}{8}$ |
| 1 | is | $\frac{1}{12}$ |

## EXAMPLES.

| | | | | |
|---|---|---|---|---|
| $\frac{1}{2}$ | 4672 at 10*s.* per Yard. | *Anſwer* | 2336*l.* | |
| $\frac{1}{3}$ | 1750 at 6*s.* 8*d.* | *Anſwer* | 583*l.* 6*s.* 8*d.* | |
| $\frac{1}{4}$ | 1894 at 5*s.* | *Anſwer* | 473*l.* 10*s.* | |
| $\frac{1}{5}$ | 3196 at 4*s.* | *Anſwer* | 639*l.* 4*s.* | |
| $\frac{1}{6}$ | 3100 at 3*s.* 4*d.* | *Anſwer* | 516*l.* 13*s.* 4*d.* | |
| $\frac{1}{8}$ | 7180 at 2*s.* 6*d.* | *Anſwer* | 897*l.* 10*s.* 0*d.* | |
| $\frac{1}{10}$ | 7420 at 2*s.* | *Anſwer* | 742*l.* | |
| $\frac{1}{12}$ | 7560 at 1*s.* 8*d.* | *Anſwer* | 630*l.* | |
| $\frac{1}{15}$ | 1802 at 1*s.* 4*d.* | *Anſwer* | 120*l.* 2*s.* 8*d.* | |
| $\frac{1}{16}$ | 1900 at 1*s.* 3*d.* | *Anſwer* | 118*l.* 15*s.* 0*d.* | |

$\frac{1}{20}$ 1874

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| $\frac{1}{20}$ | 1874 at 1*s.* per Yard. | | *Anſwer* | 93*l.* | 14*s.* | |
| $\frac{1}{24}$ | 1780 at 0*s.* | 10*d.* | *Anſwer* | 74*l.* | 3*s.* | 4*d.* |
| $\frac{1}{30}$ | 1970 at 0*s.* | 8*d.* | *Anſwer* | 65*l.* | 13*s.* | 4*d.* |
| $\frac{1}{32}$ | 7200 at 0*s.* | 7*d.* ½ | *Anſwer* | 225*l.* | | |
| $\frac{1}{40}$ | 4808 at 0*s.* | 6*d.* | *Anſwer* | 120*l.* | 4*s.* | |
| $\frac{1}{48}$ | 7290 at 0*s.* | 5*d.* | *Anſwer* | 151*l.* | 7*s.* | 6*d.* |
| $\frac{1}{60}$ | 7890 at 0*s.* | 4*d.* | *Anſwer* | 131*l.* | 10*s.* | |
| $\frac{1}{64}$ | 1270 at 0*s.* | 3¾*d.* | *Anſwer* | 19*l.* | 16*s.* | 10½*d.* |
| $\frac{1}{80}$ | 1760 at 0*s.* | 3*d.* | *Anſwer* | 22*l.* | 0*s.* | 0*d.* |
| $\frac{1}{96}$ | 1974 at 0*s.* | 2½*d.* | *Anſwer* | 20*l.* | 11*s.* | 3*d.* |
| $\frac{1}{120}$ | 1790 at 0*s.* | 2*d.* | *Anſwer* | 14*l.* | 18*s.* | 4*d.* |
| $\frac{1}{160}$ | 1750 at 0. | 1½*d.* | *Anſwer* | 10*l.* | 18*s.* | 9*d.* |
| $\frac{1}{240}$ | 1654 at 0*s.* | 1*d.* | *Anſwer* | 6*l.* | 17*s.* | 10*d.* |
| | 1750 at 0*s.* | 0¾*d.* | *Anſwer* | 5*l.* | 9*s.* | 4½*d.* |
| $\frac{1}{480}$ | 1970 at 0*s.* | 0½*d.* | *Anſwer* | 4*l.* | 2*s.* | 1*d.* |
| | 1874 at 0*s.* | ¼*d.* | *Anſwer* | 1*l.* | 19*s.* | 0½*d.* |
| | 8790 at 0*s.* | 1¾*d.* | *Anſwer* | 64*l.* | 1*s.* | 10½*d.* |
| | 7080 at 0*s.* | 2¼*d.* | *Anſwer* | 66*l.* | 7*s.* | 6*d.* |
| | 7980 at 0*s.* | 2¾*d.* | *Anſwer* | 91*l.* | 8*s.* | 9*d.* |
| | 9080 at 0*s.* | 3¼*d.* | *Anſwer* | 122*l.* | 19*s.* | 2*d.* |
| | 4804 at 0*s.* | 3½*d.* | *Anſwer* | 70*l.* | 1*s.* | 2*d.* |

| | | | | | | |
|---|---|---|---|---|---|---|
| 4890 at | 0s | 4¼d | Anſwer | 86l | 11s | 10½d |
| 4876 at | 0s | 4½d | Anſwer | 91l | 8s | 6d |
| 4970 at | 0s | 4¾d | Anſwer | 98l | 7s | 3½d |
| 5970 at | 0s | 5¼d | Anſwer | 130l | 11s | 10½d |
| 4952 at | 0s | 5½d | Anſwer | 113l | 9s | 8d |
| 5420 at | 0s | 5¾d | Anſwer | 129l | 17s | 1d |
| 5431 at | 0s | 6¼d | Anſwer | 141l | 8s | 7¾d |
| 4720 at | | 6½d | Anſwer | 127l | 16s | 8d |
| 4270 at | | 6¾d | Anſwer | 120l | 1s | 10½d |
| 5902 at | | 7d | Anſwer | 172l | 2s | 10d |
| 1972 at | | 7¼d | Anſwer | 59l | 11s | 5d |
| 2100 at | | 7¾d | Anſwer | 67l | 16s | 3d |
| 1974 at | | 8¼d | Anſwer | 67l | 17s | 1½d |
| 1780 at | | 8½d | Anſwer | 63l | 0s | 10d |
| 2500 at | | 8¾d | Anſwer | 91l | 2s | 11d |
| 2708 at | | 9d | Anſwer | 101l | 11s | 0d |
| 2570 at | | 9¼d | Anſwer | 99l | 1s | 0½d |
| 1984 at | | 9½d | Anſwer | 78l | 10s | 8d |
| 2760 at | | 9¾d | Anſwer | 112l | 2s | 6d |
| 2500 at | | 10¼d | Anſwer | 106l | 15s | 5d |
| 1780 at | | 10½d | Anſwer | 77l | 17s | 6d |
| 1798 at | | 10¾d | Anſwer | 80l | 10s | 8½d |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2008 at | | 11*d* | *Anſwer* | 92*l* | 0*s* | 8*d* |
| 2406 at | | 11¼*d* | *Anſwer* | 112*l* | 15*s* | 7½*d* |
| 2370 at | | 11½*d* | *Anſwer* | 113*l* | 11*s* | 3*d* |
| 2970 at | | 11¾*d* | *Anſwer* | 145*l* | 8*s* | 1½*d* |
| 4260 at | 1*s* | | *Anſwer* | 213*l* | | |
| 7080 at | 1*s* | 0¼*d* | *Anſwer* | 361*l* | 17*s* | 6*d* |
| 8642 at | 1*s* | 1¼*d* | *Anſwer* | 477*l* | 2*s* | 2½*d* |
| 7346 at | 1*s* | 1¾*d* | *Anſwer* | 420*l* | 17*s* | 3½*d* |
| 7400 at | 1*s* | 2¼*d* | *Anſwer* | 439*l* | 7*s* | 6*d* |
| 2760 at | 1*s* | 2¾*d* | *Anſwer* | 169*l* | 12*s* | 6*d* |
| 2500 at | 1*s* | 3¼*d* | *Anſwer* | 158*l* | 17*s* | 1*d* |
| 2752 at | 1*s* | 3¾*d* | *Anſwer* | 180*l* | 12*s* | |
| 2706 at | 1*s* | 4*d* | *Anſwer* | 180*l* | 8*s* | |
| 2752 at | 1*s* | 4¼*d* | *Anſwer* | 186*l* | 6*s* | 8*d* |
| 1980 at | 1*s* | 4½*d* | *Anſwer* | 136*l* | 2*s* | 6*d* |
| 1760 at | 1*s* | 4¾*d* | *Anſwer* | 122*l* | 16*s* | 8*d* |
| 1970 at | 1*s* | 5*d* | *Anſwer* | 139*l* | 10*s* | 10*d* |
| 1768 at | 1*s* | 5¼*d* | *Anſwer* | 127*l* | 1*s* | 6*d* |
| 1970 at | 1*s* | 5½*d* | *Anſwer* | 143*l* | 12*s* | 11*d* |
| 1942 at | 1*s* | 6¾*d* | *Anſwer* | 151*l* | 14*s* | 4½*d* |
| 1790 at | 1*s* | 7¼*d* | *Anſwer* | 143*l* | 11*s* | 5½*d* |

| | |
|---|---|
| 1890 at 1*s* 7¾*d* | *Anſwer* 155*l* 10*s* 7½*d* |
| 1742 at 1*s* 8¾*d* | *Anſwer* 150*l* 12*s* 2½*d* |
| 1595 at 1*s* 9¾*d* | *Anſwer* 144*l* 10*s* 11¼*d* |
| 1890 at 1*s* 10½*d* | *Anſwer* 177*l* 3*s* 9*d* |
| 1900 at 1*s* 10¾*d* | *Anſwer* 180*l* 2*s* 1*d* |
| 1742 at 1*s* 11½*d* | *Anſwer* 170*l* 11*s* 5*d* |
| 1870 at 1*s* 11¾*d* | *Anſwer* 185*l* 1*s* ½*d* |

When the given Price is any even Number of Shillings, Multiply the given Number of Yards, Gallons, *&c.* by half the given Price and double the Units place for Shillings; and the reſt will be Pounds and the Anſwer to the Queſtion.

### EXAMPLES.

643 at 4*s*
2

128 12*s* *Anſwer*

| | |
|---|---|
| 2460 at 6*s* | *Anſwer* 738*l* |
| 7843 at 14*s* | *Anſwer* 5490*l* 2*s* |
| 976 at 18*s* | *Anſwer* 878*l* 8*s* |
| 728 at 1*l* 8*s* | *Anſwer* 1019*l* 4*s* |
| 248 at 1*l* 18*s* | *Anſwer* 471*l* 4*s* |
| 789 at 2*l* 6*s* | *Anſwer* 1814*l* 14*s* |
| 840 at 5*l* 18*s* | *Anſwer* 4956*l* |
| 27 at 18*l* 10*s* | *Anſwer* 499*l* 10*s* |

If there be Shillings, Pence, and Farthings, or only Shillings and Pence, which are not the Aliquot Parts of a Pound, multiply the given Yards or Pounds, *&c.* by the Shillings, and take Parts for the reſt, and add them together; the Product will be the Anſwer in Shillings.

### EXAMPLES.

206 at 3*s* 2*d*
$\frac{1}{6}$ 3
618
34 4
20) 65(2 4 *Anſwer* 32*l* 12*s* 4*d*

| | |
|---|---|
| 260 at 5*s* 10½*d* | *Anſwer* 76*l* 7*s* 6*d* |
| 240 at 9*s* 2*d* | *Anſwer* 110*l* |
| 240 at 11*s* 4½*d* | *Anſwer* 136*l* 10*s* |
| 1201 at 12*s* 7½*d* | *Anſwer* 758*l* 2*s* 7½*d* |
| 708 at 13*s* 9*d* | *Anſwer* 486 15*s* |
| 708 at 13*s* 9½*d* | *Anſwer* 488 4*s* 6*d* |
| 720 at 14*s* 11½*d* | *Anſwer* 538*l* 10*s* |
| 28 at 15*s* 4*d* | *Anſwer* 21*l* 9*s* 4*d* |
| 928 at 18*s* 3¾*d* | *Anſwer* 849*l* 14*s* |
| 571 at 19*s* ¾*d* | *Anſwer* 544*l* 4*s* 8¼*d* |
| 29 at 2*l* 13*s* 10*d* | *Anſwer* 78*l* 1*s* 2*d* |
| 27 at 3*l* 18*s* 4*d* | *Anſwer* 105*l* 15*s* |
| 48 at 4*l* 1¾*d* | *Anſwer* 192*l* 7*s* |

| | |
|---|---|
| 90 at 4*l* 17*s* 8*d* | *Anſwer* 439*l* 10*s* |
| 44 at 11*l* 14*s* 6*d* | *Anſwer* 515*l* 18*s* |
| 50 at 12*l* $1\frac{1}{2}$*d* | *Anſwer* 600*l* 6*s* 3*d* |

When the Price of an Integer and the given Quantity are of ſeveral Denominations, multiply the Price by the Integers, and take Parts with the Parts of the Integer, in order to which it will be neceſſary to remember the following Table, of the equal Parts of a Hundred Weight.

*lb*
56 is the Half
28 is the 4th
16 is the 7th
14 is the 8th

*lb*
7 is the 16th
4 is the 28th
2 is the 56th

| *C* | *Q* | *lb* | | *l* | *s* | *d* | |
|---|---|---|---|---|---|---|---|
| 9 | 2 | 14 | of Sugar at | 1 | 17 | 4 | |
| | | | | | | 9 | |
| | | | 2 | 16 | 16 | 0 | |
| | | | 8 | | 18 | 8 | |
| | | | | | 4 | 8 | |
| | | | | 17 | 19 | 4 | *Anſwer* |

11*C* 2*Q* 16*lb* of Tobacco at 3*l* 14*s* 7*d* per *Cwt.*
*Anſwer* 48*l* 8*s* $4\frac{1}{4}$*d*

15*C* 3*Q* 12*lb* of Sugar at 2*l* 1*s* 2*d* per *Cwt.*
*Anſwer* 32*l* 12*s* $9\frac{2}{4}$*d*

7*C* 1*Q* 13*lb* of Tallow at 3*l* 17*s* $4\frac{1}{4}$*d* per *Cwt.*
*Anſwer* 28*l* 9*s* $9\frac{1}{4}$*d*

9*C* 0*Q* 19*lb* of Soap at 4*l* 17*s* 2d per *Cwt.*
*Anſwer* 44*l* 10*s* $11\frac{1}{2}$*d*

7*C* 1*Q* 0*lb* of Sugar at 3*l* 7*s* $5\frac{1}{2}$*d* per *Cwt.*
*Anſwer* 24*l* 9*s* $0\frac{3}{4}$*d*

5*C* 1*Q* 15*lb* of Tobacco at 3*l* 14*s* $7\frac{1}{4}$*d* per *Cwt.*
*Anſwer* 20*l* 1*s* $7\frac{3}{4}$*d*

9*C* 2*Q* 17*lb* of Tallow at 2*l* 15*s* 9*d* per *Cwt.*
*Anſwer* 26*l* 18*s* 0½*d*

4*C* 3*Q* 21*lb* of Sugar at 3*l* 5*s* 7½*d* per *Cwt.*
*Anſwer* 16*l* 4¼*d*

17*C* 3 27*lb* of Cloves at 7*l* 7*s* 5½*d* per *Cwt.*
*Anſwer* 132*l* 12 11*d*

When the given Quantity is but a Part of the Integer, or whole Thing, then you muſt take the Aliquot or even Parts as before.

### EXAMPLES.

What's the Value of 3 Pounds at 4*l* 7*s* 6*d* per *Cwt.*

| | £. | *s.* | *d* | |
|---|---|---|---|---|
| ⅛ | 4 | 7 | 6 | |
| 7 | | 10 | 11¼ | |
| 2 | | | | |
| | | 1 | 6¾ | |
| | | | 9¾ | |
| | | 2 | 4 | *Anſwer* |

What's the Value of 5 Pounds at 7*l* 14*s* 9*d* per *Cwt?*
*Anſwer* 0*l* 6*s* 10¾*d*

What's the Value of 7 Pounds, at 5*l* 7*s* 9½*d* per *Cwt?*
*Anſwer* 0*l* 6*s* 8¾*d*

What's the Value of 9 Pounds at 7*l* 16*s* 7*d* per *Cwt?*
*Anſwer* 0*l* 12*s* 7*d*

What's the Value of 11 Pounds at 4*l* 16*s* 8¼*d* per *Cwt?*
*Anſwer* 0*l* 9*s* 5¾*d*

What's the Value of 12 Pounds at 9*l* 14*s* 2*d* per *Cwt.*
*Anſwer* 1*l* 0*s* 9½*d*

What's the Value of 13*l* Pounds at 2*l* 19*s* 11¼*d* per *Cwt?*
*Anſwer* 6*s* 11*d*

What's the Value of 49 Pounds at 5*l* 17*s* 4*d* per *Cwt?*
*Anſwer* 2*l* 11*s* 4*d*

What's the Value of 79 Pounds at 7*l* 4*s* 6*d* per *Cwt?*
*Anſwer* 5*l* 1*s* 11*d*

# TARE AND TRETT.

IN this Rule there are ſix Things to be obſerved, *viz.* the Groſs Weight, the Tare, the Suttle, the Trett, the Cloff, and the Neat.

Groſs Weight is the Weight of the Goods, including the Caſk, Veſſel, Bag, Box, or whatever they are packed up in.

Tare is an Allowance made to the Purchaſer, for the Weight of the Caſk, Bag, or Box, and whatever elſe contains the Goods bought; and is at ſo much *per* Bag, *&c.* or ſo much *per* Hundred Weight, or ſo much in the whole Groſs.

Suttle is when the Tare is taken from the Groſs, and another Abatement is to be made.

Trett is an Abatement of 4*lb.* per 104*lb.* that is, the twenty-ſixth Part, allowed by Act of Parliament for the Dirt, Waſte, or Duſt, that may be in any Spices or Drugs.

Cloff is an Allowance of 2*lb.* on every Draught above 3*cwt.* to the Merchants of *London,* on ſome ſort of Goods, as Beaver, Galls, Madder, Argol, *&c.*

Neat Weight is when all the Deduction is made out of the Groſs.

*Note,* 1. The only Weight that is uſed in this Rule is Avoirdupois. 2dly, To bring Pounds into Gallons, multiply by 2, divide by 15. 3dly, 7½ *lb.* makes 1 Gallon of Oil.

## The RULE.

Multiply the Number of Hogſheads by the Tare, and the Product ſubtract from the Groſs; the Remainder will be the Neat.

1. In 14 *hhds.* of Sugar, each weighing groſs 3 *Cwt.* 1 *qr.* 16 *lb.* Tare 30 *lb.* per *Hhd.* how much neat Weight?

```
                        C.  Q.  lb.
   14                    3   1  16
   30  4                         7
 ---------              -----------
28)420(15               23   3   0
   28   --                       2
  -----    3  3         -----------
   140                  47   2   0
   140                   3   3   0
  -----                 -----------
                        43   3   0
                        -----------
```

*Anſwer* 43 *Cwt.* 3 *qrs.* 0 *lb.*

2. What is the neat Weight of 20 Hhds. of Tobacco, the groſs Weight 97 *C.* 1 *qr.* 17 *lb.* Tare 98 *lb.* per Hhd. *Anſwer* 79 *Cwt.* 3 *qrs.* 17 *lb.*

3. In 50 Bales of Silk, each Groſs 198 *lb.* Tare per Bale 15 *lb.* how much neat Weight? *Anſwer* 9150 *lb.*

## SECTION I.

If the Tare be the aliquot Parts of an Hundred Weight, what Part or Parts the Tare is of, divide the whole Groſs by it, and ſubtract the Quotient from the Groſs; the Remainder will be the neat Weight.

### EXAMPLES.

1. In nine Barrels of Soap, each 4 *Cwt.* 2 *qrs.* 7 *lb.* Groſs, Tare 16 *lb.* in 112 *lb.* how many Pounds Neat?

| | *C.* | *Q.* | *lb.* |
|---|---|---|---|
| | 4 | 2 | 7 |
| | | | 9 |
| $\frac{1}{7}$) | 41 | 0 | 7 |
| | 5 | 3 | 18 |
| *Anſwer* | 35 | 0 | 2 |

2. In 11 Hhds. of Raiſins, each Hhd. weighing 9 *Cwt.* 3 *qrs.* 19 *lb.* Groſs, Tare 10 *lb.* per 112 *lb.* how many Cwt? *Anſwer* 99 *Cwt.* 1 *qr.* 4 *lb.*

3. In 12 Hhds. of Sugar, each Hhd. weighing 12 *Cwt.* 3 *qrs.* 21 *lb.* Groſs, Tare 14 *lb.* in 112 *lb.* how many Pounds Neat. *Anſwer* 15215 $\frac{1}{2}$ *lb.*

4. In 50 Barrels of Starch, each weighing 2 *Cwt.* 0 *qrs.* 19 *lb.* Groſs, Tare 12 *lb.* per 112 *lb.* how many Pounds Neat? *Anſwer* 10849 *lb.* Neat.

5. In two Hhds. of Sugar, each weighing 6$\frac{1}{2}$ *Cwt.* Tare 10 *lb.* in 112 *lb.* how much neat Weight? *Anſwer* 11 *Cwt.* 3 *qrs.* 10 *lb.*

Bought four Hhds. Sugar, weight groſs as under:

| | *C.* | *Q.* | *lb.* | | *lb.* | |
|---|---|---|---|---|---|---|
| N° 1 | 4 | 2 | 12 | Tare | 97 | |
| 2 | 3 | 3 | 17 | | 84 | |
| 3 | 5 | 1 | 9 | | 109 | |
| 4 | 4 | 1 | 19 | | 92 | *Anſw.* 14 *Cwt.* 3 *qrs.* 11 *lb.* |

## SECTION II.

When the Tare and Trett are both allowed, the Rule is, to ſubtract the Tare from the Groſs, the Remainder is the Suttle; which divide by 26, being the fourth Part of 104; the Quotient will be the Trett, which deduct from the Suttle; the Remainder is the Neat.

1. In ten Barrels of Spices, each Groſs 2 *Cwt.* 3 *qrs.* 11 *lb.* Tare 22 *lb.* per Barrel, Trett 4 *lb.* in 104 *lb.* I demand the neat Weight? *Anſwer* 25 *cwt.* 2 *qrs.* 0 *lb.*

2. In 27 *cwt.* 3 *qrs.* 12 *lb.* of Spices, Groſs, Tare 12 *lb.* per 112 *lb.* Trett 4 *lb.* per 104 *lb.* I demand the neat Weight. *Anſwer* 23 *cwt.* 3 *qrs.* 19 *lb.*

3. What is the neat Weight of 17 Bags of Coffee, each weighing Groſs 3 *cwt.* 2 *qrs.* 19 *lb.* Tare 15 *lb.* per 112 *lb.* Trett 4 *lb.* per 104 *lb.* *Anſwer* 51 *cwt.* 3 *qrs.* 24 *lb.*

4. In 11 Barrels of Starch, weighing each Groſs 3 *cwt.* 1 *qr.* 27 *lb.* Tare 8 *lb.* per 112 *lb.* Trett 4 *lb.* per 104 *lb.* I demand the neat Weight? *Anſwer* 34 *cwt.* 1 *qr.* 5 *lb.*

5. In 135 Sacks of Ginger, each weighing Groſs 2 *cwt.* 3 *qrs.* 21 *lb.* Tare 9 *lb.* per 112 *lb.* the Trett 4 *lb.* per 104 *lb.* How many *cwt.* Neat. *Anſwer* 350 *C.* 2 *qrs.* 19 *lb.*

*N. B.* It is cuſtomary, among Merchants, only to regard the even Pounds Tare, not allowing any Parts of a Pound; as for other Allowances are two Pounds out of every Draught above 3 *cwt.* in Cloff Goods that are damaged, deducting ſo much per Bag or Barrel, and in the whole.

## VULGAR FRACTIONS.

NOTATION of Fractions depends upon this Suppoſition, that one whole Thing, whatſoever it be, may be conceived diviſible into any Number of equal Parts. A Fraction, or broken Numbers, is one or more Part, or Parts of an Integer, or whole Thing, according as it is divided; and muſt conſiſt of two Parts, *viz.* A Numerator and Denominator, which are placed one above the other, and ſeparated by a Line thus $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{7}$, *&c.* and are thus expreſſed. One-half, Two-thirds, Three-fourths, Five-ſevenths *&c.* The Denominator is placed below the Line, and

ſhewet

ſheweth into how many equal Parts the Integer Unit is divided. The Numerator is ſet above the Line, and ſheweth how many of the ſaid equal Parts are in the Fraction. A Vulgar Fraction is Simple or Compound; a ſimple Fraction is the Fraction of an Integer; as $\frac{3}{9}$, $\frac{5}{7}$, $\frac{7}{42}$.

A Compound Fraction is a Fraction of a Fraction, as $\frac{2}{3}$ of $\frac{3}{4}$, $\frac{1}{2}$ of $\frac{1}{4}$, *&c.*

A ſimple Fraction is eitherProper or Improper.

A proper Fraction has its Numerator leſs than the Denominator.

An improper Fraction, hath the Numerator greater than its Denominator, when the Numerator and Denominator are equal, the Fraction is equal to an Unit, as $\frac{3}{3}$, $\frac{6}{6}$, $\frac{8}{8}$, $\frac{12}{12}$, are all equal to 4, each being equal to one.

If the Numerator and Denominator of a Fraction be multiplied by one, or both divided by one and the ſame Number, ſo that nothing remains, that Fraction will be of the ſame Value as before ſuch Multiplication or Diviſion.

## ABBREVIATION of FRACTIONS.

### A GENERAL RULE.

OF the Numerator and Denominator, divide the Greater by the Leſs; if any Thing remains, divide the Diviſor thereby; and thus continue to divide always the laſt Diviſor by the laſt Remainder till nothing remains, (rejecting the Quotients) and this laſt Diviſor will be the greateſt common Meaſure whereby the Numerator and Denominator muſt be divided, to bring the Fraction into its loweſt Terms.

*N. B.* If one be the laſt Diviſor the Fraction cannot be abbreviated, for it is in its loweſt Terms already.

### EXAMPLES.

1. Abbreviate $\frac{285}{1311}$, Facit $\frac{5}{33}$ by 57
2. $\frac{648}{576}$ $\frac{9}{8}$ by 72

Obſerve that one of the above Examples is a Proper, the other an Improper Fraction, which are reduced to their loweſt Terms.

|  |  |  |  |  |  |
|---|---|---|---|---|---|
| 3. | Abbreviate $\frac{364}{468}$ | Facit | $\frac{7}{9}$ | by | 52 |
| 4. | $\frac{580}{725}$ | to | $\frac{4}{5}$ | by | 145 |
| 5. | $\frac{3927}{4284}$ | to | $\frac{11}{12}$ | by | 357 |
| 6. | $\frac{459}{621}$ | to | $\frac{17}{23}$ | by | 27 |
| 7. | $\frac{442}{468}$ | to | $\frac{17}{18}$ | by | 26 |
| 8. | $\frac{5325}{6975}$ | to | $\frac{71}{93}$ | by | 75 |
| 9. | $\frac{1547}{2639}$ | to | $\frac{17}{29}$ | by | 91 |
| 10. | $\frac{1232}{1456}$ | to | $\frac{11}{13}$ | by | 112 |
| 11. | $\frac{13125}{28500}$ | to | $\frac{35}{76}$ | by | 375 |
| 12. | $\frac{74691}{99588}$ | to | $\frac{3}{4}$ | by | 24897 |
| 13. | $\frac{6550}{8515}$ | to | $\frac{10}{13}$ | by | 655 |
| 14. | $\frac{5476}{55204}$ | to | $\frac{37}{373}$ | by | 148 |
| 15. | $\frac{3024}{3696}$ | to | $\frac{9}{11}$ | by | 336 |
| 16. | $\frac{15405}{101910}$ | to | $\frac{13}{86}$ | by | 1185 |

The preceding Rule is general, and may ſerve in all Caſes, yet ſometimes a Fraction may be abbreviated more ſpeedily, by one of the following Rules.

1. When the Numerator and Denominator do each of them end with a Cypher, or Cyphers, cut off equal Cyphers in both, and the remaining Figures will be a Fraction of the ſame Value, in leſſer, if not in its leaſt Terms.

### EXAMPLES.

1. $\frac{11000}{13000}$ is equal to $\frac{11}{13}$ | 3. $\frac{320}{960}$ is equal to $\frac{32}{96}$ or $\frac{1}{3}$
2. $\frac{5320}{6800}$ is equal to $\frac{53}{68}$ | 4. $\frac{42000}{95000}$ is equal to $\frac{42}{65}$

2. If the Numerator and Denominator be even Numbers, the Fraction may always be abbreviated by 2, and ſometimes by 4, 6, 8, *&c.*

1. $\frac{32}{128} = \frac{16}{64} = \frac{8}{32} = \frac{1}{4}$ | 3. $\frac{96}{144} = \frac{48}{72} = \frac{12}{18} = \frac{2}{3}$
2. $\frac{96}{324} = \frac{48}{162} = \frac{8}{27}$ | 4. $\frac{192}{320} = \frac{96}{160} = \frac{24}{40} = \frac{3}{5}$

3. When you diſcern any Number that will equally divide both Numerator and Denominator, you may Abbreviate the Fraction thereby.

1. $\frac{28}{35} = \frac{4}{5}$ by 7 | 3. $\frac{168}{420} = \frac{2}{5}$ by 7, 6 and 2
2. $\frac{54}{162} = \frac{1}{3}$ by 6 and 9 | 3. $\frac{168}{392} = \frac{3}{7}$ by 8 and 7

REDUC-

## REDUCTION of VULGAR FRACTIONS.

TO reduce Fractions of divers Denominations to a common Denominator. This Rule, has two Parts to find the common Denominator, and to find the new Numerator.

*Rule*, Multiply all the Denominators together, for a common Denominator, and each Numerator into all the Denominators but its own, for a new Numerator.

### EXAMPLES.

1. Reduce $\frac{3}{7}$ and $\frac{5}{8}$ to a common Denominator, Facit $\frac{24}{56}$ $\frac{35}{56}$.

2. Reduce $\frac{7}{8}$ $\frac{9}{12}$ and $\frac{11}{14}$ to a common Denominator, Facit $\frac{1176}{1344}$ $\frac{1008}{1344}$ $\frac{1056}{1344}$.

3. Reduce $\frac{6}{8}$, $\frac{4}{12}$, $\frac{7}{9}$ and $\frac{11}{14}$ to a common Denominator, Facit $\frac{9072}{12096}$ $\frac{4032}{12096}$ $\frac{9408}{12096}$ $\frac{9504}{12096}$.

4. Reduce $\frac{1}{2}$, $\frac{2}{10}$, $\frac{5}{6}$ and $\frac{7}{8}$ to a common Denominator Facit $\frac{480}{960}$ $\frac{192}{960}$ $\frac{800}{960}$ $\frac{840}{960}$.

5. Reduce $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$ and $\frac{5}{6}$ into a common Denominator, Facit $\frac{72}{144}$, $\frac{96}{144}$, $\frac{108}{144}$ $\frac{120}{144}$.

6. Reduce $\frac{4}{5}$, $\frac{7}{8}$, $\frac{9}{12}$ and $\frac{6}{14}$ to a common Denominator, Facit $\frac{5376}{6729}$, $\frac{5880}{6720}$, $\frac{5040}{6720}$, $\frac{2880}{6720}$.

### *To* REDUCE *a* COMPOUND FRACTION *to a* SIMPLE ONE, *Equivalent thereto.*

*Rule*, Multiply all the Numerators, continually together, for a new Numerator, and all the Denominators for a new Denominator, and it is done, but it is beſt to expreſs the Fraction in its loweſt Terms.

### EXAMPLES.

1. Reduce $\frac{1}{2}$ of $\frac{2}{3}$ of $\frac{3}{4}$ to a ſimple Fraction, Facit $\frac{1}{4}$.
2. Reduce $\frac{2}{3}$ of $\frac{3}{4}$ of $\frac{4}{5}$ to a ſimple Fraction, Facit $\frac{2}{5}$.
3. Reduce $\frac{2}{3}$ of $\frac{3}{5}$ of $\frac{5}{8}$ to a ſimple Fraction, Facit $\frac{1}{4}$.
4. Reduce $\frac{1}{4}$ of $\frac{3}{8}$ to a ſimple Fraction, Facit $\frac{3}{32}$.
5. Reduce $\frac{1}{3}$ of $\frac{1}{4}$ of $\frac{4}{5}$ to a ſimple Fraction, Facit $\frac{2}{30}$.
6. Reduce $\frac{5}{6}$ of $\frac{7}{8}$ of $\frac{11}{12}$ to a ſimple Fraction, Facit $\frac{385}{576}$.

### *To* REDUCE *a* MIXT NUMBER *to an* IMPROPER FRACTION.

*Rule*, Multiply the integral Part by the Denominator of the Fraction to the Product, add the Numerator, and under the Sum, place the Denbminator with a ſmall Stroke between them.

### EXAMPLES.

1. Reduce 5 $\frac{1}{2}$ to an improper Fraction, Facit $\frac{11}{2}$.
2. Reduce 7 $\frac{5}{6}$ to an improper Fraction, Facit $\frac{47}{6}$.
3. Reduce 8 $\frac{4}{5}$ to an improper Fraction, Facit $\frac{44}{5}$.
4. Reduce 14 $\frac{11}{17}$ to an improper Fraction, Facit $\frac{249}{17}$.

## *To* REDUCE an IMPROPER FRACTION *to its* PROPER TERMS.

*Rule*, Divide the Numerator by the Denominator, and the Quotient is the whole Number, and the Remainder place for a Numerator to the given Denominator.

### EXAMPLES.

1. Reduce $\frac{11}{2}$ to a mixt Number. *Anſwer* 5 $\frac{1}{2}$.
2. Reduce $\frac{47}{6}$ to a mixt Number. *Anſwer* 7 $\frac{5}{6}$.
3. Reduce $\frac{44}{5}$ to a mixt Number. *Anſwer* 8 $\frac{4}{5}$.
4. Reduce $\frac{249}{17}$ to a mixt Number. *Anſwer* 14 $\frac{11}{17}$.

*N. B.* Theſe Examples prove the proceeding ones.

## *To* REDUCE *the* FRACTION *of one* DENOMINATION, *to the* FFACTION *of another*.

*Rnle*, If the given Fraction is leſs than the Fraction you want to Reduce it to, compare it with all the Denominations betwixt it and that you would Reduce it to, and make it a compound Fraction; and reduce that compound Fraction to a ſimple one. But if the given Fraction be greater than that you want to reduce it to, Multiply the given Numerator by the Parts of the Denominations between it, and that Denomination you would reduce it to, for a new Numerator, and place it over the given Denominator.

### EXAMPLES.

1. Reduce $\frac{3}{4}$ of a Penny to the Fraction of a Pound. The compound Fraction will be $\frac{3}{4}$ of $\frac{1}{12}$ of $\frac{1}{20}$, and to reduce it to a ſimple Fraction is $\frac{3}{960}$, of equal Value with the given Fraction.

2. Reduce $\frac{1}{4}$ of a Farthing to the Fraction of a Shilling is $\frac{1}{192}$. The compound Fraction will be $\frac{1}{4}$ of $\frac{1}{4}$ of $\frac{1}{12}$ and reduced to a ſimple Fraction.

3. Reduce $\frac{4}{5}$ of an Ounce Troy, to the Fraction of a Pound, $\frac{4}{5}$ of $\frac{1}{12} = \frac{4}{60} = \frac{1}{15}$.

4. Reduce $\frac{5}{8}$ of a Pound Avoirdupois to the Fraction of *Cwt.* it will ſtand thus $\frac{3}{8}$ of $\frac{1}{112} = \frac{15}{896}$.

5. Reduce $\frac{7}{9}$ of a Pint of Wine to the Fraction of a Hhd. it will ſtand thus $\frac{7}{9}$ of $\frac{1}{2}$ of $\frac{1}{4}$ of $\frac{1}{63} = \frac{7}{4536}$.

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## REDUCTION of VULGAR FRACTIONS.

TO find the Value of a Fraction in the known Parts of Coin, Weight, Meaſure, Motion, &c.

*Rule*, Multiply the Numerator of the Fraction, by the Parts of the next inferior Denomination that are equal to an Unit of the ſame denomination with the Fraction, then divide that Product by the Denominator, and the Quotient gives you its Value in the ſame Parts you multiplied; and if any thing remains, multiply it by the Parts of the next inferior Denomination, and divide as before; do ſo till you can bring it no lower, and the ſeveral Quotients will give you the Value of the Fraction required, and if any thing remains place it for a Numerator over the former Denominator. The following Examples will make it plain.

### EXAMPLES.

1. What is the Value of $\frac{3}{4}$ of a Pound? *Anſwer* 15*s.*
2. What is the Value of $\frac{7}{8}$ of a Pound? *Anſwer* 17*s.* 6*d.*
3. What is the Value of $\frac{5}{8}$ of a Pound? *Anſwer* 12*s.* 6*d.*
4. What is the Value of $\frac{7}{16}$ of a Pound? *Anſwer* 8*s.* 9*d.*
5. What is the Value of $\frac{5}{16}$ of a Pound? *Anſwer* 6*s.* 3*d.*
6. What is the Value of $\frac{3}{12}$ of a Pound? *Anſwer* 5*s.*
7. What is the Value of $\frac{62}{84}$ of a Pound? *Anſwer* 14*s.* 9*d.*

$\frac{12}{84}$.

8. What is the Value of $\frac{17}{24}$ of a Shilling? *Anſwer* 0*s.* 8$\frac{1}{2}$*d.*
9. What is the Value of $\frac{16}{84}$ of a Shilling? *Anſwer* 0*s.* 2$\frac{1}{4}$*d.*

$\frac{1}{7}$.

10. What is the Value of $\frac{36}{43}$ of a Shilling? *Anſwer* 10*d.*

$\frac{2}{43}$.

11. Reduce $\frac{11}{16}$ of a Pound Troy to its proper Quantity. *Anſwer 8oz. 5dw.*

12. Reduce $\frac{44}{12}$ of a Pound Avoirdupois to its proper Quantity. *Anſwer 5oz. 5dr.* $\frac{1}{3}$.

13. Reduce $\frac{6}{18}$ of a Ton Weight to its proper Quantity. *Anſwer 6C. 2Q. 18lb. 10oz. 10dr.* $\frac{4}{6}$.

14. Reduce $\frac{3}{7}$ of 9*C.* 3*Q.* 21*lb.* 15*oz.* 15*dr.* to its proper Quantity. *Anſwer 4C. 1Q. 1lb. 6oz. 13dr* $\frac{2}{7}$.

15. Reduce $\frac{16}{24}$ of a Chaldron of Coals to its proper Quantity. *Anſwer 24 Bſh.*

16. Reduce $\frac{6}{9}$ of a Ton of Wine to its proper Quantity. *Anſwer 1 Pipe 0 Hhd. 42 Gals.*

17. Reduce $\frac{14}{17}$ of a natural Day to its proper Quantity. *Anſwer 19H. 45m. 52ſe.* $\frac{16}{17}$.

18. Reduce $\frac{7}{10}$ of a yard to its proper Quantity. *Anſwer 2qrs. 3nls.* $\frac{1}{5}$.

19. Reduce $\frac{6}{7}$ of a Barrel of Beer to its proper Quantity. *Anſwer 30galls.* $\frac{6}{7}$.

## *To* REDUCE *any* GIVEN QUANTITY *to a* VULGAR FRACTION.

*Rule,* Bring the given Quantity to the loweſt Terms mentioned for a Numerator, and put the Denomination of the ſame Term underneath, will be the Fraction required.

### EXAMPLES.

1 Reduce 15 Shillings to the Fraction of a Pound. *Anſwer* $\frac{3}{4}$.

2. Reduce 17*s.* 6*d.* to the Fraction of a Pound. *Anſwer* $\frac{7}{8}$.

3. Reduce 12*s.* 6*d.* to the Fraction of a Pound. *Anſwer* $\frac{5}{8}$.

4. Reduce 8*s.* 9*d.* to the Fraction of a Pound. *Anſwer* $\frac{7}{16}$.

5. Reduce 6*s.* 3*d.* to the Fraction of a Pound. *Anſwer* $\frac{5}{16}$.

6. Reduce 5*s.* 0*d.* to the Fraction of a Pound. *Anſwer* $\frac{1}{4}$.

7. Reduce 14*s.* 9*d.* $\frac{12}{84}$ to the Fraction of a Pound. *Anſwer* $\frac{31}{42}$.

8. Reduce 0*s.* 8$\frac{1}{2}$*d.* to the Fraction of a Shilling. *Anſwer* $\frac{17}{24}$.

9. Reduce 0*s.* 2$\frac{1}{4}$*d.* $\frac{1}{7}$ to the Fraction of a Shilling. *Anſwer* $\frac{4}{21}$.

10. Reduce 0*s.* 10*d.* $\frac{2}{43}$ to the Fraction of a Shilling. *Anſwer* $\frac{36}{43}$.

11. Reduce 2*l.* 11*s.* 1$\frac{1}{2}$*d.* to the Fraction of 7*l.* 7*s.* *Anſwer* $\frac{3}{8}$.

12. Reduce 1*oz.* 5*dw.* to the Fraction of a Pound Troy. *Anſwer* $\frac{11}{16}$.

13. Reduce 5*oz.* 5*dr.* $\frac{1}{3}$ to the Fraction of a Pound Averdupois. *Anſwer* $\frac{1}{3}$.

14. Reduce 6*C.* 2*qrs.* 18*lb.* 10*oz.* 10*drs* $\frac{4}{6}$, to the Fraction of a Ton Weight. *Anſwer* $\frac{1}{3}$.

15. Reduce 3*C.* 1*qr.* 7*lb.* 5*oz.* 5*drs.* to the Fraction of 9*C.* 3*qrs.* 21*lb.* 15*oz.* 15*drs.* *Anſwer* $\frac{1}{3}$.

16. Reduce 24 Buſhels to the Fraction of a Chaldron of Coals. *Anſwer* $\frac{12}{3}$.

17. Reduce 1 Pipe and 42 Gallons to the Fraction of a Tun of Wine. *Anſwer* $\frac{2}{3}$.

18. Reduce 3*Wks.* 1*d.* 9*hs.* 36*ms.* to the Fraction of a Month. *Anſwer* $\frac{4}{5}$.

19. Reduce 19*Hrs.* 45*ms* 52*ſds.* $\frac{16}{17}$, to the Fraction of a natural Day. *Anſwer* $\frac{14}{17}$.

26. Reduce 2*qrs.* 3*nls.* $\frac{1}{5}$, to the Fraction of a Yard. *Anſwer* $\frac{7}{16}$.

20. Reduce 30*gls.* $\frac{6}{7}$ to the Fraction of a Barrel of Beer. *Anſwer* $\frac{6}{7}$.

Thus ends Reduction of Fractions, the Knowledge of which is of univerſal Uſe in moſt Branches of Arithmetic.

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## ADDITION OF VULGAR FRACTIONS.

### RULE.

BRING all the Fractions to be added into a common Denominator, by Reduction; then add the Numerators into one Sum, and under that Sum place the common Denominator.

### EXAMPLES.

1. Add $\frac{1}{2}$ and $\frac{7}{8}$ together; the Sum is $\frac{11}{8}$, or 1 $\frac{3}{8}$
2. Add $\frac{2}{3}$, $\frac{3}{4}$, and $\frac{4}{5}$ into one Sum. *Anſwer* $\frac{133}{60}$, or 2 $\frac{13}{60}$
3. Add $\frac{1}{4}$, $\frac{1}{6}$, and $\frac{7}{8}$ into one Sum. *Anſwer* $\frac{31}{24}$, or 1 $\frac{7}{24}$.
4. Add $\frac{7}{8}$, $\frac{5}{16}$, and $\frac{11}{24}$ into one Sum. *Anſwer* $\frac{79}{48}$, or 1 $\frac{31}{48}$.

5. Add $\frac{6}{7}$, $\frac{8}{9}$, and $\frac{3}{14}$, into one Sum. *Anſwer* $\frac{1729}{882}$, or $1\frac{847}{882}$.

6. Add $\frac{2}{3}$ of $\frac{7}{8}$ and $\frac{2}{3}$ of $1\frac{1}{3}$ into one Sum. *Anſw.* $\frac{109}{36}$, or $3\frac{1}{16}$.

*N. B.* The Compound Fraction muſt be reduced to a Simple, and then add according to the Rule.

7. Add $\frac{2}{3}$, $\frac{3}{4}$, $\frac{4}{5}$, $\frac{5}{6}$, $\frac{9}{10}$, $\frac{11}{12}$, $\frac{4}{15}$, and $\frac{29}{30}$ into one Sum. *Anſw.* $6\frac{23}{30}$.

### *To add* FRACTIONS *and* INTEGERS *together.*

*Rule,* Add the Fraction as before directed, annexing their Sum to the Sum of the Integers.

8. Add $200\frac{1}{2}$ $99\frac{3}{4}$, $6\frac{6}{5}$, $\frac{4}{5}$, $125\frac{3}{20}$ $20\frac{5}{8}$ $119\frac{1}{4}$, $59\frac{1}{4}$, and $11\frac{3}{20}$ into one Sum. *Anſwer* $701\frac{39}{40}$.

### *To add* FRACTIONS *of different* DENOMINATIONS *together.*

*Rule,* Reduce them to one Denomination by the Rules in Reduction and then add them as above directed.

9. Add $\frac{3}{4}$ of a Pound to $\frac{7}{8}$ of a Shilling. *Anſwer* $\frac{508}{640}$ of a Pound or 10*s.* $10\frac{1}{2}$*d.*

10. Add $\frac{7}{8}$ of a Shilling to $\frac{3}{4}$ of a Penny. *Anſwer* $\frac{15}{16}$ of a Shilling, or 0*s.* $10\frac{1}{4}$*d.*

11. Add $\frac{3}{4}$ of a Yard to $\frac{2}{3}$ of a Foot. *Anſwer* $\frac{35}{36}$ of a Yard or 2 Feet 11 Inches.

12. Add $\frac{5}{6}$ of a Mile to $\frac{3}{4}$ of a Yard. *Anſwer* $\frac{17609}{21120}$ of a Mile or 6*ms.* 26*poles* 4*yds* 1*foot*, 4 *Inches* $\frac{7}{8}$.

13. Add $\frac{3}{4}$ of a Quarter of Corn to $\frac{2}{3}$ of a Peck. *Anſwer* $\frac{37}{48}$ of a Quarter or 6 *Bſh.* 0*pks.* 1*gal.* 2*pts.* $\frac{2}{3}$.

## SUBTRACTION of VULGAR FRACTIONS.

### RULE,

WHEN you have brought the given Fractions into one Denominator, Subtract the leſſer Number from the Greater, and place the Remains over the common Denominator, which will be the Difference betwixt the given Fractions.

### EXAMPLES.

1. From $\frac{3}{5}$ take $\frac{1}{5}$, Remains $\frac{2}{5}$.
2. Subtract $\frac{1}{4}$ from $\frac{3}{4}$ Reſt $\frac{1}{2}$.
3. What is the Difference between $\frac{3}{4}$ and $\frac{5}{12}$? *Anſwer* $\frac{1}{3}$.

4. If $\frac{5}{12}$ be deducted from $\frac{7}{9}$ what is the exceſs? *Anſwer* $\frac{13}{36}$.

5. From $\frac{7}{8}$ of a Pound take $\frac{6}{7}$ of a Pound, remains $\frac{1}{56}$ of a Pound.

6. From $\frac{11}{15}$ take $\frac{3}{5}$ remains $\frac{2}{15}$.

7. From $\frac{108}{112}$, take $\frac{3}{4}$, remains $\frac{3}{14}$.

8. From $\frac{48}{56}$, take $\frac{4}{7}$, remains $\frac{16}{56}$ or $\frac{2}{7}$.

9. From 48 $\frac{2}{7}$, take 21 $\frac{2}{3}$, remains 26 $\frac{13}{21}$.

10. From 27, take $\frac{3}{7}$, remains 26 $\frac{4}{7}$.

11. From $\frac{2}{3}$ of 84, take $\frac{3}{4}$ of 22, remains 39 $\frac{1}{2}$.

12. From $\frac{108}{112}$, take $\frac{2}{3}$ of $\frac{3}{4}$ of $\frac{5}{6}$, remains $\frac{4416}{8064}$ or $\frac{23}{42}$.

13. From 30 $\frac{2}{7}$, take $\frac{16}{19}$, remains 29 $\frac{52}{133}$.

14. From 17 $\frac{1}{2}$, take $\frac{3}{4}$ of 22, remains 1.

15. From $\frac{3}{4}$ of a Pound, take $\frac{7}{8}$ of a Shilling. *Anſwer* $\frac{452}{640}$ of a Pound or 14s. 1$\frac{1}{2}$*d.*

16. From $\frac{2}{3}$ of a Shilling, take $\frac{3}{4}$ of a Penny. *Anſwer* $\frac{87}{144}$ of a Shilling or 7$\frac{1}{4}$.

17. From $\frac{3}{4}$ of a *Cwt.* take $\frac{7}{12}$ of a Pound. *Anſwer* $\frac{4004}{5376}$ or 2*qrs.* 27*lb.* 6*oz.* 10*drs.* $\frac{2}{3}$.

18. From $\frac{7}{8}$ of a League, take $\frac{3}{4}$ of a Mile. *Anſwer* $\frac{15}{24}$ or 1 *Mile* 7 *Furlongs.*

19. From 1 Ell, take $\frac{7}{40}$ of a Yard. *Anſwer* $\frac{172}{160}$ or 1 *Yd.* 0*qrs.* 1*nl.*

20. From $\frac{1}{2}$ of a Chaldron, take $\frac{2}{3}$ of a Buſhel. *Anſwer* $\frac{104}{216}$ or 17*Bſhls.* 1 *Pk.* $\frac{1}{3}$

21. From 14 Weeks take 19 Days $\frac{4}{15}$. *Anſwer* 11*Wks.* 1*day* $\frac{6}{10}$.

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## MULTIPLICATION of VULGAR FRACTIONS.

### RULE,

MULTIPLY the Numerators together for a new Numerator, and the Denominators for a new Denominator.

### EXAMPLES.

1. Multiply $\frac{3}{4}$ by $\frac{2}{3}$. *Anſwer* $\frac{6}{12}$ or $\frac{1}{2}$.

2. What is the Product of $\frac{7}{8}$ multiplied by $\frac{3}{4}$? *Anſwer* $\frac{21}{32}$.

3. If $\frac{1}{2}$ of $\frac{5}{6}$ be multiplied by $\frac{2}{5}$, What is the Product? *Anſwer* $\frac{1}{6}$.

4. Multiply $\frac{3}{4}$ of $\frac{2}{3}$ by $\frac{1}{2}$ of $\frac{2}{5}$. *Anſwer* $\frac{1}{10}$.

*Note* 1. Reduce your Compound Fractions to ſimple and mixt Numbers to improper Fractions, and the preceding Rule is general.

2. As whole Numbers, multiplied by whole Numbers, do increaſe the Product, ſo proper Fractions multiplied by proper Fraction, do diminiſh the Product; or which is the ſame Thing, decreaſes it in the ſame Proportion as the multiplying Fraction is to Unity.

5. Multiply $\frac{3}{7}$ by $\frac{9}{11}$. *Anſwer* $\frac{27}{77}$.
6. Multiply $\frac{3}{5}$ by $\frac{4}{9}$. *Anſwer* $\frac{12}{45}$.
7. Multiply $\frac{2}{3}$ of $\frac{3}{9}$ by $\frac{7}{8}$ of $\frac{11}{12}$. *Anſwer* $\frac{462}{2592}$ or $\frac{77}{432}$.
8. Multiply $9\frac{1}{4}$ by $4\frac{1}{2}$. *Anſwer* $\frac{333}{8}$ or $41\frac{5}{8}$.
9. Multiply $7\frac{5}{8}$ by 4. *Anſwer* $\frac{244}{8}$ or $30\frac{1}{2}$.
10. Multiply $12\frac{3}{4}$ by $6\frac{1}{2}$. *Anſwer* $\frac{663}{8}$ or $82\frac{7}{8}$.

The preceding Queſtions are the ſame as if it was put in the following Words in Menſuration.

11. If a Board Plank be 12 Feet 9 Inches long, and 6 Inches broad, What is the ſuperficial Content? *Anſwer* $82\frac{7}{8}$ Feet, or when the Fraction is valued it will be 82*Feet* 10*Inches* 6*p*. So that by this we ſee that all Queſtions in croſs Multiplication of Fractions and ſometimes more quick.

12. Suppoſe a Plank be $\frac{3}{5}$ of 16 Feet long, and $\frac{7}{8}$ of 10 Feet broad, what is the ſuperficial Content? *Anſwer* 84 *Feet.*

13. If a Room be 16 Feet, 7 Inches long, and 12 Feet 5 Inches broad, what is the ſuperficial Content? *Anſwer* 205 *Feet,* 10*Inches* 11*p*.

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## DIVISION of VULGAR FRACTIONS.

WHEN the Diviſor and Dividend are both ſimple Fractions, or reduced to ſuch,

*Rule,* Multiply the Numerator of the Dividend, by the Denominator of the Diviſor for a new Numerator, and the Denominator of the Dividend, by the Numerator of the Diviſor for a new Denominator; which new Fraction will be the required Quotient:

Or invert your Diviſor, and proceed as in Multiplication, and the Products will be the Quotient, as before, which I think the beſt.

EXAMPLES.

### EXAMPLES.

1. Divide $\frac{2}{3}$ by $\frac{3}{4}$, Place it thus $\frac{3}{4}|\frac{2}{3}|\frac{8}{9}$, the *Anſwer*
Or thus, inverting your Diviſor it will ſtand thus $\frac{4}{3}|\frac{2}{3}|\frac{8}{9}$ the *Anſwer* as before.

2. Divide $\frac{4}{5}$ by $\frac{3}{4}$. *Anſwer* $\frac{16}{15}$ or 1 $\frac{1}{15}$.
3. Divide $\frac{11}{12}$ by $\frac{1}{2}$. *Anſwer* $\frac{22}{12}$ or 1 $\frac{5}{6}$.
4. Divide $\frac{7}{8}$ by $\frac{3}{4}$. *Anſwer* $\frac{28}{24}$ or 1 $\frac{1}{6}$.
5. Divide $\frac{11}{12}$ by $\frac{6}{12}$. *Anſwer* $\frac{132}{72}$ or 1 $\frac{5}{6}$.
6. Divide $\frac{7}{8}$ by $\frac{6}{8}$. *Anſwer* $\frac{56}{48}$ or 1 $\frac{1}{6}$.
7. Divide $\frac{3}{8}$ by $\frac{1}{4}$. *Anſwer* $\frac{12}{8}$ or 1 $\frac{1}{2}$.
8. Divide 7 by $\frac{3}{4}$. *Anſwer* $\frac{28}{3}$ or 9 $\frac{1}{3}$.
9. Divide 8 $\frac{3}{4}$ by $\frac{3}{4}$. *Anſwer* $\frac{140}{12}$ or 1 $\frac{2}{3}$.
10. Divide 20 $\frac{1}{5}$ by 9 $\frac{1}{8}$. *Anſwer* $\frac{808}{365}$ or 2 $\frac{78}{365}$.
11. Divide 7 of $\frac{2}{9}$ by 9 of $\frac{2}{11}$. *Anſwer* $\frac{154}{162}$ or $\frac{77}{81}$.

In part of the foregoing Examples, when the Dividend and Diviſor have one common Denominator, or may be reduced to one; reject the denominator and divide the Numerator of the Dividend, by the Numerator of the Diviſor, and it gives the *Anſwer.*

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## The RULE of THREE DIRECT in VULGAR FRACTIONS.

THE Method of this Rule in Fractions, is the very ſame as in whole Numbers. And when you have ſtated your Queſtion, you muſt multiply the ſecond and third Terms together, and divide that Product by the firſt, and the Quotient is of the ſame Name as your middle Term, and the Anſwer to your Queſtion.

### EXAMPLES.

1. If $\frac{7}{8}$ of a Yard of Cloth coſt $\frac{3}{4}$ of a Pound, what will $\frac{2}{3}$ of a Yard coſt? *Anſwer* $\frac{48}{84}$ of a Pound or 11*s.* 5*d.* $\frac{1}{7}$

2. If $\frac{2}{3}$ of a Yard of Cloth coſt $\frac{4}{7}$ of a Pound, what will $\frac{7}{8}$ of a Yard coſt? *Anſwer* $\frac{84}{112}$ of a Pound or 15*s.*

3. If $\frac{3}{40}$ of a Yard coſt $\frac{2}{3}$ of a Pound, what will $\frac{5}{6}$ of a Yard coſt at that Price? *Anſwer* $\frac{40}{54}$ of a Pound or 14*s.* 9*d* $\frac{3}{4}$ $\frac{1}{9}$.

4. If $\frac{5}{6}$ of a Yard coſt $\frac{20}{27}$ of a Pound, what will $\frac{3}{4}$ of a Yard coſt? *Anſwer* $\frac{360}{540}$ or 13*s* 4*d.*

5. If $\frac{11}{12}$ of a Yard coſt $\frac{6}{2}$ of a Pound, what will $\frac{1}{2}$ of a Yard coſt? *Anſwer* $\frac{72}{44}$ or 1*l.* 12*s.* 8*d*$\frac{1}{2}$ $\frac{10}{11}$.

6. If $\frac{1}{2}$ of a Yard coſt $\frac{18}{11}$ of a Pound, what will $\frac{11}{12}$ of a Yard coſt? *Anſwer* $\frac{6}{2}$ or 3 Pounds.

7. If $\frac{7}{8}$ of a Pound of Sugar coſt $\frac{3}{4}$ of a Shilling, how much Sugar will $\frac{8}{9}$ of a Shilling buy at the ſame Rate? *Anſwer* 1*lb.* $\frac{1}{27}$.

8. $\frac{9}{10}$ of a *C.* coſt 3*l.* 11*s.* what will 7 *C.* $\frac{1}{2}$ coſt? *Anſwer* $\frac{1065}{36}$ or 59*l.* 3*s.* 4*d.*

9. If 7 $\frac{1}{2}$ *Cwt.* coſt, $\frac{1065}{36}$ of Pounds, what will $\frac{9}{10}$ of *Cwt.* coſt? *Anſwer* $\frac{71}{20}$ or 3*l.* 11*s.*

10. If $\frac{2}{3}$ of $\frac{3}{4}$ of a Pound Weight coſt $\frac{52}{268}$ of a Pound, what coſt the *C.* Weight at that Price? *Anſwer* $\frac{11648}{168}$ or 69*l.* 6*s.* 8*d.*

11. If one *Cwt.* coſt $\frac{11648}{168}$ Pounds, what will $\frac{2}{3}$ of $\frac{3}{4}$ of a Pound weight of the ſame coſt? *Anſwer* $\frac{52}{168}$ of a Pound or 6*s.* 2*d.* $\frac{11}{47}$.

12. A Wine Merchant laid out 785*l.* $\frac{3}{8}$ in Madeira Wine at 5*s* $\frac{7}{8}$ *per* Gallon, pray what Quantity did he buy in? *Anſwer* 2673 $\frac{29}{47}$ *Gallons.*

13. A Plumber bought 7 $\frac{1}{2}$ Fodders of Lead, each weighing 19 $\frac{1}{2}$ at 3*d* $\frac{7}{8}$ *per* Pound, I demand the Value of Lead? *Anſwer* 264*l.* 9*s.* 4$\frac{1}{2}$*d.*

14. A Draper laid out 176*l.* 19*s.* $\frac{5}{6}$ in 5 Pieces of Bag Holland at 4*s.* 9*d.* $\frac{2}{5}$ *per* Ell *Flemiſh*, I demand how many *Engliſh* Ells did each Piece contain? *Anſwer* 14 $\frac{3}{5}$.

15. If $\frac{3}{4}$ of $\frac{5}{6}$ of a Hundred Weight leſs $\frac{3}{5}$ coſt 2*l.* $\frac{7}{8}$, what muſt I pay for 5 *Cwt.* leſs $\frac{3}{4}$ of 2 *C.* $\frac{1}{2}$? *Anſwer* 49*l.* 0*s.* 1*d.* $\frac{5}{5}$.

## SINGLE RULE REVERSE in FRACTIONS.

THIS is the ſame as Whole Numbers, to which Rule I refer to work the following Examples.

1. Suppoſe one lends $\frac{3}{4}$ of 100*l* Pounds $\frac{7}{13}$ of a Year, how long ought he to lend me $\frac{5}{12}$ of the ſame to requite the formor Favour? *Anſwer* $\frac{63}{65}$ of a Year or 12*Ms.* 2 *Wks.* 2*Ds.* $\frac{4}{5}$.

*N. B.* 13 Months is one Year, and in this Rule the third Term, when your Queſtion is ſtated, will always be your Diviſor, and the Quotient will be the Anſwer to the Queſtion, and of the ſame Name as your middle Term.

2. If 6 $\frac{1}{2}$ of Cloth, 2 Yards wide, will cover a Table, how many Yards will cover the ſame Table, when the Cloth is $\frac{1}{2}$ Yard wide? *Anſwer* $\frac{52}{2}$ or 26 Yards.

3. If one lends 92 Pounds $\frac{4}{10}$ of a Year, how much ought he to lend me $\frac{7}{24}$ of a Year? *Anſwer* $\frac{4416}{35}$ or 126*l* $\frac{6}{35}$.

4. If one lends 126*l.* $\frac{6}{33}$ Pounds $\frac{7}{24}$ of a Year, what Sum ought he to lend $\frac{4}{10}$ of a Year? *Anſwer* 92 Pounds.

5. If 12 Men can mow $24\frac{1}{2}$ Acres in $10\frac{2}{3}$ Days, in what Time will 6 Men do the ſame? *Anſwer* $21\frac{1}{3}$ Days.

6. If 6 Men mow $24\frac{1}{2}$ Acres in $21\frac{1}{3}$ Days, in what Time will 12 Men do the ſame? $10\frac{2}{3}$ Days.

7. I have a Room that is 108 $\frac{3}{7}$ Feet round, and 13 $\frac{2}{5}$ high, which I have a mind to line with Paper that is, $1\frac{3}{4}$ Feet wide, I demand how many Yards will cover the ſaid Room? *Anſwer* 276 $\frac{184}{245}$.

# THE DOUBLE RULE OF THREE IN VULGAR FRACTIONS.

WHEN you have ſtated your Queſtion, multiply and divide by the Rules given in Multiplication, and Diviſion, of Vulgar Fractions, and the Quotient will be the Anſwer to your Queſtion, and of the ſame Name as your middle Term.

## EXAMPLES.

1. If 10 Men in 20 Days ſpend $33\frac{1}{3}$ Pounds, what will 74 Men ſpend in $92\frac{1}{2}$ Days? *Anſwer* $1140\frac{5}{6}$ Pounds.

2. If 8 Men in 7 Days earn $9\frac{2}{6}$ Pounds, what will 56 Men earn in $21\frac{1}{2}$ Days? *Anſwer* $200\frac{2}{3}$ Pounds.

3. A Perſon by repeated Experience found that his Family conſiſting of 10 Perſons, did drink $\frac{5}{9}$ of a Hhd. of Wine in 7 Days; but they being increaſed to 35 in Family, how much Wine muſt he have to ſerve him one Month or 28 Days? *Anſwer* $7\frac{7}{9}$ *Hhds.*

4. Twelve Gentlemen with each a Servant, being upon a Party of Pleaſure, found their Expences in 9 Days amounted to $129\frac{3}{5}$ Pounds, but being joined in Company with 42 more with each a Servant, they agreed to continue together 38

Days, what Sum will defray their Expences after this Meeting? *Anſwer* $2462\frac{2}{5}$ Pounds.

5. Suppoſe the Wages of 7 Men $\frac{3}{4}$ of a Month be $18\frac{3}{8}$ Pounds, what time muſt 35 Men ſerve for 420 Pounds? *Anſwer 3Ms. 1Wk. 5Ds.*

6. The Wages of 12 Men $\frac{1}{52}$ of a Year be $11\frac{11}{20}$ Pounds, what Number of Men may one Employ one Year or 52 Weeks for $5405\frac{2}{5}$ Pounds? *Anſwer* 108 Men.

7. A Gentleman bought $25\frac{3}{4}$ Yards of broad Cloth, and $39\frac{5}{8}$ Yards of Shalloon, to make him and his Children Cloaths the Cloth was $1\frac{5}{8}$ Yard wide, and the Shalloon $\frac{7}{8}$ of a Yard wide; but changing his Mind, he would have the Cloth $\frac{12}{15}$ wide, and the Shalloon $\frac{3}{5}$ of a Yard wide, how much will be equal to the Quantity he firſt mentioned? *Anſwer* Cloth $29=3\frac{31}{56}$, the Shalloon $57=3\frac{7}{48}$.

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# NOTATION OF DICIMAL FRACTIONS.

THE Denominator of a decimal Fraction is not expreſſed but underſtood, and is an Unit with as many Cyphers annexed, as there are Places in the Numerator. So $\frac{5}{10}$ is expreſſed thus ,5, and $\frac{75}{100}$ thus ,75; and $\frac{625}{1000}$ thus ,625 the Point or Comma is prefixed to diſtinguiſh them from whole Numbers.

*N. B.* Cyphers placed to the left Hand of Integers, and to the right Hand of Decimals, neither increaſeth or decreaſeth their Value, as 8, 08, 008 theſe being Integers do ſtill retain the ſame Value.

And ,7 ,70 ,700 theſe being Decimals do retain the ſame Value, each being 7 Parts when Unity is divided into ten Parts.

But Cyphers placed to the right Hand of an Integer increaſeth its Value, and to the left Hand of a Decimal decreaſeth its Value, As

,3 is Three Tenth Parts
,03 is Three Hundred Parts
,003 is Three Thouſand Parts
,0003 is Three Ten Thouſand Parts
,00003 is Three Hundred Thouſand Parts.

By the above you may obſerve, Decimal Fractions do decreaſe in ten fold Proportion to the Right Hand, as whole Numbers increaſe to the Left Hand.

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## ADDITION OF DICIMALS.

IS the ſame as whole Numbers, ſeeing every Place towards the Right Hand is ten times greater than that which is next it towards the Right Hand; as appears by Notation.

*Rule*, Add the ſeveral Sums into one, the ſame as in whole Numbers. Then diſtinguiſh the Decimal Places, by pointing of as many Places towards the Left Hand, as are found Decimals in any one Line you have to add.

### EXAMPLES.

| *Pounds* | *Shillings* | *Yards* |
|---|---|---|
| 14,672 | 237,146 | 2734,1076 |
| 37,281 | 723,674 | 3615,2157 |
| 76,3146 | 216,78432 | 3612,1346 |
| 752,432 | 671,362 | 2137,1276 |
| 673,124 | 814,276 | 5721,0047 |
|  |  | 3137,0461 |
|  |  | 3147,0706 |
| 1553,8236 |  |  |

*N. B.* I diſtinguiſh four Places of Dicimals in the Total, by reaſon the third Line has four Places in the firſt Example.

| *Miles.* | *Ounces.* | *Acres.* |
|---|---|---|
| 213,1467 | 482,6351 | 215,27 |
| 317,2704 | 25,2534 | 468,315 |
| 576,3142 | 152,7381 | 72,274 |
| 374,2904 | 9,6815 | 183,561 |
| 213,1467 | 31,7215 | 2151,24 |
| 316,1046 | 1271,10 | 7,12371 |
| 127,3746 | 43,2185 | 15,2152 |
|  | 231,7428 | 275,134 |

| *Gallons.* | *Pence.* | *Farthings.* |
|---|---|---|
| 1,235162 | 7003,2135 | 68121,10 |
| ,327145 | 601,0031 | 5327,213 |
| ,2823 | 9,17821 | 281,6245 |
| ,764 | 321,0105 | 126,21 |
| ,231 | ,9821 | 41230,0001 |
| ,731 | 725,001 | 235,71 |
| ,21 | 63,2152 | 60,423 |
| 31467 | 91,760237 | 2131,715 |

## SUBTRACTION OF DECIMAL FRACTIONS,

IS the ſame as whole Numbers, only mind to place Units under Units in whole Numbers; Tenths under Tenths in Decimal Parts.

### EXAMPLES.

|  | £ |  | *Yards* |  | *Ells* |
|---|---|---|---|---|---|
| From | 274,372 | From | 574,040 | From | 371,047 |
| Take | 196,6742 | Take | 197,6875 | Take | 197,3147 |
| Reſt | 76,6678 |  |  |  |  |
| Proof | 274,3720 |  |  |  |  |

|  | *Years* | *Days* | *Weeks* |
|---|---|---|---|
| From | 274,037 | 631,21 | 5610,21 |
| Take | 198,476 | 29,3215 | 4278,168 |

|  | *Tuns* | *Hhds.* | *Minutes* |
|---|---|---|---|
| From | 247, | 713,6215 | 23154, |
| Take | ,835 | 20,6091 | 6,70151 |

## MULTIPLICATION OF DECIMALS.

PLACE the Factors, and work as in whole Numbers, but mind to ſeparate ſo many Places of Decimals on the Right Hand of the Product, as are in both the Factors, and if there be not ſo many, the Defect muſt be ſupplied with a Cypher or Cyphers towards the Left Hand.

### EXAMPLES.

1. Multiply 4,29 by ,57. Product 2,4453
2. Multiply ,046 by ,42. Product ,01932
3. Multiply 3,745 by ,074
4. Multiply 2,764 by 3,745
5. Multiply 57,64 by 3,25
6. Multiply 67,425 by ,25
7. Multiply 37,425 by 4,753
8. Multiply 27,6314 by ,00007
9. Multiply 37,145 by 2,745
10. Multiply 2,7437 by 2,145
11. Multiply 37425 by 3,745
12. Multiply 3,71 by 162
13. Multiply 2,72 by 3,75
14. Multiply 2,75 by 3,65
15. Multiply 2,75 by 4,64
16. Multiply 3,74 by 2,76
17. Multiply 2,74 by 3,765
18. Multiply 235, by ,235

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## DIVISION OF DECIMALS.

THIS is the ſame with that of whole Numbers till the Work be done; then cut off ſo many Decimal Places in the Quotient as the Dividend has more than the Diviſor; if there be not ſo many, ſupply the Defect with Cyphers towards the Left Hand.

### EXAMPLES.

1. Divide 2,4453 by ,57 Facit 4,29
2. Divide ,01932 by ,42 Facit ,046
3. Divide 1141,875 by 1,75 Facit 652,5

*Note,* Sometimes it will be neceſſary to place Cyphers to the Right Hand of the Dividend, and then conſider how many Decimal Places you would have in the Quotient, and how many there are in the Diviſor; and make ſo many in the Dividend as in both.

### EXAMPLES:

4. Divide 5729 by 438, and to have four Places of Decimals in the Quotient, it will then ſtand thus 438)5729,0000(13,0799, *&c.*

As there are no Decimals in the Diviſor, but there are 4 in the Dividend, and muſt be 4 in the Quotient, according to the Rule.

5. Divide 47,237 by 2,73
6. Divide 67,394 by 27,4
7. Divide 673,2414 by 72,94
8. Divide 674,3219 by 76,43
9. Divide 572,56 by ,125
10. Divide 6737,6452 by ,25
11. Divide 1274625 by 1,75
12. Divide 67,2534 by 3,75
13. Divide 12,75 by ,00465
14. Divide 374,62 by ,07265
15. Divide ,014762 by ,25
16. Divide 67,452 by 75,015
17. Divide 57,6435 by 27,65
18. Divide 7435, by ,7435

## REDUCTION OF DECIMALS.

TEACHES to Reduce a Vulgar Fraction to a Decimal, equivalent to the ſame in Value, which is done by the following Proportions. As the Denominator of the given Vulgar Fraction, is to its Numerator, ſo is an Unit, with ſo many Cyphers as you intend your Decimal ſhall have Places, to the Decimal required; which is the ſame as to add Cyphers to the Numerator, and divide by the Denominator, and the Quotient is the Decimal Fraction. Obſerving the Rule in Diviſion of Decimal Fractions.

*N. B.* By this the Tables containing the Decimal Parts of any Integer are contracted.

1. Reduce $\frac{3}{4}$ to a Decimal. *Anſwer* ,75.

2. Reduce $\frac{1}{2}$ to a Decimal. *Anſwer* ,5.

3. Reduce $\frac{1}{4}$ to a Decimal. *Anſwer* ,25.

4. Reduce one Inch to the Decimal of a Foot, that ſhall have 6 Places of Decimals. *Anſwer* ,083333.

*N. B.* That the Threes are called repeating Decimals, and as they are ſtopt in this Example at 6 Places, of the Deficiency of this Decimal is, if a Foot was divided into a Million of equal Parts, it would then want four of them Parts to be equal to the given Vulgar Fraction. Obſerve this in all repeating and circulating Decimals.

5. Reduce 2 Inches to the Decimal of a Foot. *Anſwer* ,166666.

6. Reduce 2 Inches to the Decimal of a Foot. *Anſwer* ,25.

7. Reduce 7 Inches to the Decimal of a Foot. *Anſwer* ,58333.

8. Reduce 8 Inches to the Decimal of a Foot. *Anſwer* ,66666.

9. Reduce $\frac{1}{4}$ of $\frac{1}{12}$ to a Decimal Fraction. *Anſwer* ,020833.

10. Reduce $\frac{1}{2}$ of $\frac{1}{12}$ to a Decimal Fraction. *Anſwer* ,041666.

11. Reduce $\frac{3}{4}$ of $\frac{1}{12}$ to a Decimal Fraction. *Anſwer* ,0625.

12. Reduce $\frac{1}{4}$ of a Penny to the Decimal of a Pound. *Anſwer* ,0010416.

13. Reduce $\frac{1}{2}$ of a Penny to the Decimal of a Pound. *Anſwer* ,0020833.

14. Reduce $\frac{3}{4}$ of a Penny to the Decimal of a Pound. *Anſwer* ,003125.

15. Reduce 1 Penny to the Decimal of a Pound. *Anſwer* ,004166.

16. Reduce $4\frac{1}{4}$*d.* to the Decimal of a Pound. *Anſwer* ,0177085.

17. Reduce $5\frac{3}{4}$*d.* to the Decimal of a Pound. *Anſwer* ,0239583.

18. Reduce $11\frac{1}{2}$*d.* to the Decimal of a Pound. *Anſwer* ,0479166.

19. Reduce 1*s.* $0\frac{1}{2}$*d.* to the Decimal of a Pound. *Anſwer* ,0520833.

20. Reduce 1*s.* $4\frac{1}{2}$*d.* to the Decimal of a Pound. *Anſwer* ,06875.

21. Reduce 2*s.* $0\frac{3}{4}$*d.* to the Decimal of a Pound. *Anſwer* ,103125.

22. Reduce 12*s.* $7\frac{1}{2}$*d.* to the Decimal of a Pound. *Anſwer* ,631083.

23. Reduce 17*s.* $6\frac{3}{4}$*d.* to the Decimal of a Pound. *Anſwer* ,0878125.

24. Reduce 14*lb.* to the Decimal of a *Cwt.* *Anſwer* ,125.

25. Reduce 16*lb.* to the Decimal of an *Cwt.* *Anſwer* ,1428571.

26. Reduce 4 Inches to the Decimal of a Yard. *Anſwer* ,1111111.

27. Reduce 8 Perches to the Decimal of an Acre. *Anſwer* ,05.

28. Reduce 7 Gallons to the Decimal of a Hhd. of Wine. *Anſwer* 1111111.

In this Manner you may make Decimal Tables of Money, Weight, Meaſure, Time, *&c.*

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## To find the Value of a DECIMAL FRACTION.

### RULE,

MULTIPLY the Decimal by the Parts of the Integer, and cut off ſo many Places to the Right Hand, as your Decimal conſiſts of, and thoſe to the Left, will be Integers of the next inferior Denomination.

### EXAMPLES.

1. What is the Value of ,41875 of a Pound. *Anſwer* 8*s.* $4\frac{1}{2}$*d.*

2. What is the Value of ,421875 of a Pound. *Anſwer* 8*s.* $5\frac{1}{4}$.

3. What is the Value of ,484374 of a Pound. *Anſwer* 9*s.* $8\frac{1}{4}$.

4. What is the Value of ,11875 of a Pound. *Anſwer* 2*s.* $4\frac{1}{2}$*d.*

5. What is the Value of ,5197916 of a Pound. *Anſwer* 10*s.* $4\frac{3}{4}$*d.*

6. What is the Value of ,6364583 of a Pound. *Anſwer* 12*s.* $8\frac{3}{4}$*d.*

7. What is the Value of ,7697916 of a Pound. *Anſwer* 15*s.* 4$\frac{3}{4}$*d.*

8. What is the Value of ,8697916 of a Pound. *Anſwer* 17*s.* 4$\frac{3}{4}$*d.*

9. What is the Value of ,9364583 of a Pound. *Anſwer* 18*s.* 8$\frac{3}{4}$*d.*

10. What is the Value of ,9697916 of a Pound. *Anſwer* 19*s.* 4$\frac{3}{4}$*d.*

11. What is the Value of ,9989583 of a Pound. *Anſwer* 19*s.* 11$\frac{3}{4}$*d.*

12. What is the Value of ,75 of a Foot. *Anſwer* 9 *Inches.*

13. What is the Value of ,25 of a Foot. *Anſwer* 3 *Inches.*

14. What is the Value of ,5 of a Foot. *Anſwer* 6 *Inches.*

15. What is the Value of ,333333 of a Foot. *Anſwer* 4 *Inches.*

16. What is the Value of ,75 of a Shilling. *Anſwer* 9*d.*

17. What is the Value of ,25 of a Shilling? *Anſwer* 3*d.*

18. What is the Value of ,666666 of a Shilling? *Anſwer* 8*d.*

19. What is the Value of ,976525 of an Hundred Weight? *Anſwer* 3*qrs.* 25*lb.* 5*oz.* 14*drs.* 9248.

## THE RULE OF THREE IN DECIMALS.

WHEN you have ſtated your Queſtion, Obſerve the Rules given in Multiplication, and Diviſion of Decimals, and it differs nothing from this Rule in Whole Numbers.

### EXAMPLES.

1. If a Perſon in one Week or 7 Days, ſaves 3,85 Pounds, what will he ſave in one Year? *Anſwer* 200,57 Pounds or 200*l.* 15*s.*

2. If 7 Yards of Holland coſt 4,746857 Pounds, what will 365 Yards ſame coſt? *Anſwer* 247,515625 Pounds or 247*l.* 10*s.* 3$\frac{3}{4}$.

3. If ,75 of a Yard coſt ,15 of a Pound, what will 627,25 Yards coſt? *Anſwer* 125,45*l* or 125*l.* 9*s.*

4. If 5,25 Pounds of Tobacco coſt 10,5 Shillings, what will 978,75 Pounds coſt at that Rate? *Anſwer* 1957,5*s.* or 97*l.* 17*s.* 6*d.*

5. If 7 Yards of Cloth coſt ,05 Pounds, what will 9125 Yards coſt at that Price? *Anſwer* 12,6875*l.* or 13*l.* 13*s.* 9*d.*

6. Laid out for a Piece of Cloth 19,57*l.* I demand how many *Engliſh* Ells there were in the ſame, when I gave after the Rate of 12,25*s. per* Yard. *Anſwer* 25,56.

7. A Wine Merchant bought a Pipe of Mountain Wine for 35,27*l.* but he had the Misfortune to loſe 49,56 Gallons, I demand how he muſt ſell the Remainder *per* Gallon, ſo as to be no loſer; *Anſwer* 9*s.* 2*d.* $\frac{2}{2}$944.

8. Bought a Quantity of Malt for 107,75*l.* and Sold it out at 27,25*s. per* Quarter, by which I gained 9,28*l.* pray what Quantity did I firſt buy in? *Anſwer* 85*qrs.* 7,148*bſhls.*

9. Ship'd from *Virginia* 5 Hhds. of Tobacco each weighing 3*C.* 3*qrs.* 22,75*lb.* which coſt me 6,25*l. per Cwt.*, and I ſold it out again at 1,45*s. per lb.*, what did I gain or loſe by the Sale thereof? *Anſwer* Gain'd 36*l.* 19*s.* 1$\frac{1}{2}$*d* ,76.

10. Suppoſe a Ship of War carries 573 Sailors and they expend 146,25 Pecks of Peas in 91,275 Days, I require how long 1561,3 Pecks will laſt a Ship that carries 954 Sailors allowing the Month to be 28 Days, and 13 Months to the Year? *Anſwer* 1*yr.* 7*ms.* 25*ds.* 2637.

11. Suppoſe a Family of 23 Perſons do drink out 112,32 Gallons of Beer in 29,42 Days, I require how Gallons of Beer will be drank in 91,25 Days by another Family conſiſting of 33 Perſons? *Anſwer* 9 *Hhds.* 13,84*Galls.*

12. Suppoſe a Tax of 500,72 to be laid on a Pariſh for the building of a Church, and the Value of the Landlord's Eſtate amounting to 3171,71*l. per Ann.* what muſt a Pariſhoner pay, whoſe Eſtate is worth 200,171 *per Annum.* *Anſwer.* 31*l.* 12 01,848.

13. A Builder agreeing with a Smith for 30 Feet of Iron Railing at 30*s. per* Hundred Weight, which came to 9,68, but giving farther Order for 34 Feet of Iron Railing, in the ſame Proportion, I deſire to know the Weight and what the Expences will be? *Anſwer* Weight 7*C.* 1*qr.* 7,134*lb.* Expences 10*l.* 19*s.* 4*d.* $\frac{2}{3}$,776.

14. A young Gentleman came to an Eſtate of 1200*l. per Annum*, the Expences of his Family were 12,78*l. per* Week, his Ground Rent, and Repairs of his Eſtate 150,75 *per Ann.* to a Widow's Jointure 15,25, to be paid Quarterly, allowing himſelf 5,36*s. per* Day for private Expences, I deſire to know

how much he ſaved at the Year's End? *Anſwer* 225*l.* 17*s.* 4*d.* 3,2.

15. A Gentleman's Yearly Income being 3767,75 Pounds, his weekly Expences amount to 31,75 Pounds, Land Tax, Repairs, *&c.* amount to $\frac{1}{8}$ of his whole Eſtate, the Charitable Donations that he diſtributes amount to ,0625, of the Remainder, and his daily Pocket Expences to 1,125*l.* the Queſtion is to require what his whole Expences amount to in one Year, and the Difference betwixt them and his Eſtate. *Anſwer* Expended 2635*l.* 9*s.* 1*d*,152. The Difference 1132*l.* 5*s.* 10*d.* $\frac{2}{3}$,392.

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## BARTER or TRUCK.

IS the Exchanging of one Commodity for another, and informs Merchants as to Proportion the Quantities, as neither may ſuſtain Loſs.

1. A has 144 Ells of Linen Cloth, worth 15*d. per* Ell, which he would Barter with B for Cheeſe, at 18*s* 9*d.* 100*lb.* how many Pounds of it ſhould B give him for the Linnen? *Anſwer* 960*lb.* of Cheeſe.

2. A has Broad Cloths at 10 Guineas the Piece, and B has Mace at 12*s. per lb.* how many Pounds of Mace muſt B give A for 72 Pieces of theſe Cloths? *Anſwer* 1260.

3. A has 41*C.* 2*qrs.* 14*lb.* of Pepper at 56*s. per Cwt.* and B has Cotton at 9*d. per lb.* how much Cotton muſt B give A for his Pepper? *Anſwer* 27*C.* $\frac{3}{4}$.

4. A ſold B 18 Pieces of Linnen at 1*s.* 4*d. per* Yard, and each Piece contained 72 Yards, B gives in Part of Payment, 7 Cloths at 9*l.* 8*s* 6*d. per* Cloth, what remains due? *Anſwer* 20*l.* 8*s.* 6*d.*

5. A had 14 Hundred Weight of Sugar at 6*d. per lb.* for which B gave him 1*C.* 3*qrs.* of Cinnamon, what was it rated at *per lb*? *Anſwer* 4*s.*

6. A delivered to B 320 Dozen of Candles, at 4*s.* 6*d. per* Dozen, in a Payment whereof B gave him 30*l.* in Money, and the reſt in Cotton at 8*d. per lb.* how much Cotton was given? *Anſwer* 11*C.* $\frac{1}{4}$.

7. A bought of B 608 Yards of Broad Cloths at 14*s.* the Yard, in Payment whereof he gave him 125*l.* 12*s.* and 85*C.* 2*qrs.* 24*lb.* of Bee's Wax, the Queſtion is to know what the

Hundred Weight of the ſaid Wax was rated at? *Anſwer* 3*l.* 10*s.*

8. A has 100 Yards of Cloth worth 4*s. per* Yard, but in Barter he Values it at 5*s. per* Yard, and will have half paid down in ready Money; B has Tobacco worth 1*s.* 4*d. per lb.* which he exchanges with A for his Cloth, paying half down in ready Money; how muſt B value his Tobacco *per lb.* ſo as to be no Loſer by A, and how much Tobacco muſt A have? *Anſwer* B muſt value his Tobacco at 2*s.* 2*d.* $\frac{2}{3}$ *per lb.* and muſt give A 112*lb.* $\frac{1}{2}$.

9. A has a Piece of Cloth worth 40*s.* but in Barter he values it at 2*l.* 16*s.* 8*d:* and is reſolved to gain 10*l. per Cent.* more upon the advanced Price, and to have half paid down in ready Money, B hath Flax worth 3*d per lb.* and changes it with A for his Cloth; the Queſtion is, how B muſt value his Flax, ſo that he may be no Loſer by A, and how much Flax A muſt have? *Anſwer* 10*d* $\frac{31}{53}$ *per lb.* and A muſt have 861*lb.* of Flax.

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## LOSS AND GAIN,

DISCOVERS the Gain, or Loſs, of any Commodity having the Price they coſt, and the Price they ſold for both given.

### EXAMPLES.

1. Bought 246 Yards of Cloth for 6*s.* 7$\frac{1}{2}$*d per* Yard, and ſold it again for 7*s.* 2$\frac{1}{4}$*d.* what is gained by the ſame? *Anſwer* 6*l.* 18*s.* 4$\frac{1}{2}$*d.*

2. Bought 872 Yards of Cloth at 8*s.* 6*d. per* Yard, Sold the ſame at 10*s.* 4*d. per* Yard, what is gained by the ſame? *Anſwer* 79*l.* 18*s.* 8*d.*

3. Bought 6*C.* 3*qrs.* of Cloves at 2*s.* 4*d. per lb.* and Sold the ſame again for 105*l.* 8*s.* what is gained by the Bargain? *Anſwer* 17*l.* 4*s.*

4. Bought 248 Yards of Holland for 62*l.* how muſt it be Sold *per* Yard to gain 20*l.* 13*s.* 4*d.* by the whole Bargain? *Anſwer* at 6*s.* 8*d.*

5. Bought Goods at 4*s. per lb.* and Sold them again fo 3*s.* 4*d. per lb.* what is loſt *per Cent.* at that Rate? *Anſw* 16*l.* 13*s.* 4*d.*

6. Boug

6. Bought 365 Yards of Velvet for 337*l.* 12*s.* 6*d.* and Sold it again at 19*s.* *per* Yard, what is gained by the Bargain? *Anſwer* 9*l.* 2*s.* 6*d.*

7. Bought 40 Quarters of Malt at 25*s.* *per* Quarter, and having received Damage, I loſt 12 *per Cent.* by it, what did I loſe *per* Buſhel? *Anſwer* 4$\frac{1}{2}$*d.*

8. Shipped for *Virginia* 100 Pieces of Broad Cloth, each Piece containing 32 Yards at 17*s* 6*d.* *per* Yard, Paid for the Packing, Portage, and Shipping, 6*s.* 7*d.* *per* Piece, Duties, Exportation, and all other Charges 39*l.* 14*s.* 11*d.* In Return my Correſpondent ſends me 97 Hhds. of Tobacco, of which when I had paid Charges of Exportation 56*l.* 17*s.* I made 699*l.* 11*s.* 6*d.* I deſire to know whether I got or loſt by this Article of Trade, and how much? *Anſwer* 290*l.* 1*s.* 3*d.* gained.

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## SINGLE FELLOWSHIP, Or, FELLOWSHIP without Time,

IS when two or more Men trade together with one common Stock; and when they have gained or loſt, it ſhews how to find each Man's particular Gain or Loſs.

*Rule,* As the Sum of all the Stocks is to the whole Gain or Loſs, ſo is each Man's particular Stock to his reſpective Share of the Gain or Loſs. When you have ſtated your Queſtion as the Rule directs, multiply and divide, and the Quotient will be the Anſwer.

### EXAMPLES.

Two Men, A and B, join in Partnerſhip; A lays in 24*l.* B 72*l.* and they gain 64*l.* what is each Man's Share of the ſaid Gain? *Anſwer* A 16*l.* and B 48*l.*

2. Three Perſons make a joint Stock, A puts in 750*l.* B 450*l.* C. 300*l.* with this they trade a certain time, and, when they ballance Accounts, find, that they have gained 300*l.* What is each Man's Share of the Gain? *Anſwer* A's Gain 150*l.* B's Gain 90*l.* C's Gain 60*l.*

3. Suppoſe three Merchants make a joint Stock, wherewith they traded and gained 1890*l.* A put in 1380*l.* B 1890*l.* and C 2400*l.* What is each Man's ſhare of the ſaid

Gain proportionable to his Stock? *Anſwer* A 460*l.* B 630*l.* C. 800*l.*

4. Three Men, A, B, and C, ſent a Ship to Sea with 324 Tuns of Wine; A 144 Tuns, B 108 Tuns, and C 72 Tuns; now, ſuppoſing this Ship to fall among Privateers, who took out of her 135 Tuns of the ſaid Wine, and then let her paſs to her Port. How much muſt each Merchant ſuſtain of the Loſs, according to the Rate of his Adventure? *Anſwer* A 60 Tuns, B 45 Tnns, C 30 Tuns.

5. A Bankrupt's Effects amount to 3300*l.* and he is indebted to A 1500*l.* and to B 2700*l.* How much of the Effects belong to each Perſon? *Anſwer* 1178*l.* 11*s.* $5\frac{1}{7}$*d.* B 2121*l.* 8*s.* $6\frac{6}{7}$*d.*

6. Three Merchants, A, B, and C, entered into Partnerſhip; A put in the common Stock 364*l.* B 482*l.* and C 500*l.* By Trade they gained 867*l.* What is each Merchant to have of the ſaid Gain? *Anſwer* A 234*l.* 9*s.* *d.* $3\frac{354}{1346}$. B 310*l.* 9*s.* 5*d.* $\frac{62}{1346}$. C 322*l.* 1*s.* 3*d.* $\frac{930}{1346}$.

7. Four Merchants made a common Stock of 720*l.* A put in 90*l.* B 150*l.* C. 180*l.* and D the reſt; with this they traded till it was increaſed to 9000*l.* What did D put into Trade? and how much muſt each receive at the parting of the Money? *Anſwer* D put in 300*l.* and A muſt receive 1125*l.* B 1875*l.* C 2250*l.* and D 3750*l.*

Suppoſe A, B, and C, ſpend 20*s.* and A agrees to pay $\frac{1}{2}$ of it, B $\frac{1}{3}$, and C $\frac{1}{4}$. What did each pay? *Anſwer* A pays 9*s.* $2\frac{3}{4}$*d.* $\frac{20}{260}$, B pays 6*s.* $1\frac{1}{4}$*d.* $\frac{140}{260}$, C pays 4*s.* $7\frac{3}{4}$*d.* $\frac{100}{260}$.

In anſwering Queſtions of this Nature, obſerve, that the $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$ of 20*s.* make 21*s.* 8*d.* or 260*d.* then the Proportion will be, as 260*d.* (the Sum of all the Parts) is to 240, the Pence the Parts ſhould make; ſo each Man's particular Part to the Money he ought to pay, according to the given Proportion.

Suppoſe a Privateer take a Prize valued at 27000, and the Agreement was, that the Owners ſhould have $\frac{1}{2}$, the Captain and Officers $\frac{1}{3}$, and the Sailors $\frac{1}{4}$. How much of the Prize belongs to each Party? *Anſwer* the Owners muſt have 12461*l.* $\frac{15750}{29250}$, Captain and Officers, 8307*l.* $\frac{20250}{29250}$, Sailors muſt have 6230*l.* $\frac{22500}{29250}$, according to the required Proportion.

10. A Company of Merchants ſit out a Privateer, and it was agreed in ſharing the Prizes (if any taken) that the Merchants ſhould have 12*l.* as often as the Captain and Offi-

cers 4*l.* and the Sailors to have 2*l.* as often as the Merchants 12*l.* now it happened that they took Prizes to the Amount of 54000*l.* How much belongs to the Owners, Officers, and Sailors, according to this Agreement. *Anſwer* The Owners 36000*l.* Officers 12000*l.* and Sailors 6000*l.*

## FELLOWSHIP with Time.

Is when each Man's particular Stock is a particular Time in Partnerſhip.

*Rule.* Multiply each Man's Stock by the Time it has continued in Trade, and proceed with the Products as with the particular Stocks in the ſingle Rule.

This is as the Sums of the Stocks, and the Time, is to whole Gain or Loſs, ſo is each Perſon's particular Stock multiplied into its Time, to the particular Share of his Gain or Loſs.

### EXAMPLES.

1. Three Merchants traded together, A, B, and C; A put in 340*l.* for four Months, B 672*l.* for ſix Months, and C 284*l.* for eight Months; and they gained 200*l.* What is each Man's Share of the Gain? *Anſwer* 35*l.* 9*s.* $9\frac{1}{2}$*d.* $\frac{7520}{7664}$, B 105*l.* 4*s.* $4\frac{1}{2}$*d.* $\frac{3360}{7664}$, C 59*l.* 5s. $9\frac{1}{2}$*d.* $\frac{4448}{7664}$.

2. A and B made a common Stock; A put in 40*l.* for three Months, B 75*l.* for four Months, and they gained 70*l.* What is each Man's Share, proportionable to his Stock and Time. *Anſwer* A muſt have 20*l.* and B 50*l.*

3. Four Merchants made a joint Stock; A put in 669*l.* for 10 Months, B 810*l.* for eight Months, C 900*l.* for ſeven Months, and D 1040*l.* for 12 Months; and their Stocks were increaſed to 35145*l.* What muſt each have thereof? *Anſwer* A 7359*l.* B 7128 *l.* C 6903*l.* and D 13728*l.*

4. Three Men made a joint Stock as follows: A put in 109*l.* 5*s.* for three Months, B 450*l.* 7*s.* for four Months, and C 147*l.* 12*s.* for ſix Months; they having 209*l.* 7*s.* 2*d.* What is each Man's Share of the Gain? *Anſwer* A 22*l.* 15*s.* 2*d.* $\frac{31240}{60295}$, B 125*l.* 1*s.* 11*d.* $\frac{26103}{60295}$, C 61*l.* 10*s.* 0*d.* $\frac{2952}{60295}$.

5. Suppoſe 18900*l.* is to be divided amongſt 2 Claſſes of Men, in the firſt Claſs are 20 Men, and in the ſecond 30 Men, ut one in the firſt Claſs muſt have three times as much as

one in the Second, how much belongs to each Claſs, and what is each Man's Share? *Anſwer* 1260*l.* belongs to the firſt Claſs, and each Man muſt have 630*l.* and 6300*l.* belongs the ſecond Claſs, and each Man muſt have 210*l.*

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## DOUBLE RULE OF THREE.

IN this Rule there always muſt be five Numbers given to find the Sixth (and ſometimes there are more) State your Queſtion according to the Directions given in the ſingle Rule of Three, and in your firſt ſtating make your middle Term of the ſame Name as the Anſwer of your Queſtion requires; and for the Anſwer put the Letter A, or any other Letter, which Letter will ſupply the middle Place in your ſecond Stating, and ſo of your third, &c. If your Queſtion requires more Statings than two, obſerve well whether your Statings are in the Direct or Reverſe Rules, and Multiply your Diviſors together for a common Diviſor, and your other Numbers together for a Dividend, and divide, and your Quotient will be the Anſwer. Take care to Reduce your Queſtion into as low Terms as it will require before you State it.

### EXAMPLES.

1. Suppoſe a Perſon received 8*l.* 12*s.* for the Intereſt of a certain Sum of Money for 5 Months after the Rate of 8 *per Cent. per Ann.* The Queſtion is how much Money was delivered to raiſe that Intereſt?

| £ | £ s |
|---|---|
| 8 | 8 12 |
| 20 | 20 |
| 160 Shillings | 172 Shillings |

*s.* £. *s.*
If 160——100——172 A the firſt Stating.

*M* *M*
If 12——a——5 the ſecond Stating.

The ſecond Stating is Reverſe, that is, the leſs Time will require the more Money: So that 5 is my Diviſor in that Stating.

s.
160
5

800 the Diviſor.

Then 172
100

17200
12

206400 Dividend.

And 206400 Divided by 800, gives 258*l.* the Anſwer to the Queſtion. Obſerve this in all the following Examples.

2. If the Carriage of 1*C.* Weight 30 Miles, coſt 2*s.* what will the Carriage of 10*C.* Weight coſt, being carried 100 Miles? *Anſwer* 3*l.* 6*s.* 8*d.*

3. If the Carriage of 10*C.* Weight being carried 100 Miles coſt 3*l.* 6*s.* 8*d.* what will the Carriage of 1*C.* Weight coſt being carried 30 Miles? *Anſwer* 2*s.* the Proof of the former Queſtion.

4. What comes the intereſt of 258*l.* to for five Months at the Rate of 8*l.* *per Cent.* *per Ann?* *Anſwer* 8*l.* 12*s.* the Proof of the firſt Queſtion.

5. If 7 Men in 12 Days reap 84 Acres of Wheat, how many Acres will 20 Men reap in 5 Days? *Anſwer* 100 Acres.

6. If 100 Pounds principal in 12 Months gain 6*l.* Intereſt, what will 675*l.* gain in 9 Months? *Anſwer* 30*l.* 7*s.* 6*d.*

7. A Perſon received 30*l.* 7*s.* 6*d.* for the Intereſt of a certain Sum of Money for 9 Months, at the Rate of 6 *per Cent.* *per Ann.* how much Money was out at Intereſt? *Anſwer* 675*l.* *N. B.* 12 Months is a Year.

8. If 38*l.* 8*s.* be the Wages of 32 Men 24 Days, what will be the Wages of 8 Men 3 Days? *Anſwer* 40*s.*

9. If 20 Horſes in 24 Days eat 120 Buſhels of Provender, how many Buſhels will 14 Horſes eat in 16 Days? *Anſwer* 56 Buſhels.

10. If in a Family of 14 Perſons there are drank out 48 Gallons of Beer in eight Days, how many Perſons will drink out 36 Gallons in 12 Days? *Anſwer* 7 Perſons.

11. If when a Buſhel of Wheat coſt 10 Shillings the Weight of a Loaf worth 9*d.* is 36 Ounces, what ought the Penny Loaf to weigh when Wheat is 3*s.* 4*d.* the Buſhel? *Anſwer* 12 Ounces.

12. A Perſon received 78*l.* 7*s.* 6*d.* for the Principal and Intereſt of a certain Sum of Money, at the Rate of 6 *per Cent. per Annum* for nine Months; what Sum of Money was out? *Anſwer* 75*l.*

13. If 300 Pioneers caſt a Trench of 200 Rods in eight Hours, how many Rods will 13600 Pioneers caſt a like Trench in three Hours? *Anſwer* 3400 Rods.

14. If 12 Bricklayers build a Wall two Feet broad and 100 Feet long in 30 Days, in how many Days will 20 Bricklayers build a Wall three Feet broad and 1000 Feet long? *Anſwer* 270 Days.

15. If 200*lb.* *Engliſh*, make 190*lb.* *Flemiſh*, and 38*lb.* *Flemiſh*, 50*lb.* at *Belonia*, how many Pounds *Engliſh* are equal to 100*lb.* at *Belonia?* *Anſwer* 80*lb.* *Engliſh*.

16. If 80*lb.* *Engliſh* make 100*lb.* at *Belonia*, and 50*lb.* at *Belonia* make 38*lb.* *Flemiſh*, how many Pounds *Engliſh* make 190*lb.* *Flemiſh?* *Anſwer* 200*lb.* *Engliſh*.

17. Suppoſe I can have a Ton of Iron drawn from *Deptford* to *Weſtminſter* $4\frac{1}{2}$ Miles Diſtance, for 19*s.* what muſt a Piece of Ordnance weigh, that, in the ſame Proportion, is drawn from the Warren at *Woolwich* to the *Tower of London*, $9\frac{3}{4}$ Miles for 45*s.* *Anſwer* 21*C.* 3*q.* 12*lb.* $\frac{144}{247}$.

18. Suppoſe a Man can walk from *London* to *Edinburgh*, 450 Miles diſtant, in 18 Days, when the Days are 17 Hours long, how many *Daniſh* Miles (19 of which make 70 *Engliſh* Miles) can he travel in three Months, when the Days are 17*H.* 49*m.* long? *Anſwer* $597\frac{1}{30}$ Miles.

### QUESTIONS *to exerciſe the foregoing Rules.*

1. A Draper bought 100 Pieces of Broad Cloths, each 24 Yards, at 13*s.* 7*d.* per Yard, what is the Value of 60 Pieces at that Rate? *Anſwer* 978*l.* 0*s.* 0*d.*

2. I gave 24*l.* 19*s.* 6*d.* for a Hogſhead of Wine, and ſold it ſo that I loſt 6*l.* *per Cent.* what did it go at a Gallon? *Anſwer* 7*s.* $5\frac{1}{4}$*d.* $\frac{7}{9}$.

3. Bought 960 *Flemiſh* Ells of *Dutch* Lace, which coſt in all 311*l.* 11*s.* 6*d.* for 100 *Engliſh* Ells of which he paid after

the Rate of 17*s.* 7*d.* per Yard, what did he give per Ell *Flemiſh* for the Remainder? *Anſwer* 5*s.* 1*d.* $\frac{29}{2380}$.

4. Suppoſe, by ſelling Sugar at ſeven Guineas per *Cwt.* I gained 17*l.* *per Cent.* what does it ſtand me in per Pound? *Auſwer* 1*s.* 1*d.* $\frac{33}{112}$.

5. A Merchant bought 49 Cheſts of Prunes, each weighing neat 3*C.* 2*qrs.* 11*lb.* for 399*l.* how muſt he ſell them per Pound to gain 50*l.* 9*s.* 11$\frac{1}{2}$*d.* by them? *Anſw.* 5$\frac{1}{4}$*d.* $\frac{16831}{19747}$.

6. My Factor at *Guiney* ſends me 129*lb.* of Gold Duſt, for 1212 Yards of Broad Cloths, which ſold at 19*s.* per Ell, *Engliſh*; and by ſo doing I found I cleared 150*l.* by the Bargain, I demand what the Cloth ſtood me in per Yard? *Anſwer* 12*s.* 8*d.* $\frac{1}{2}$ $\frac{3}{4}$.

7. A Perſon in Truſt for the Poor has 400*l.* 10*s.* to diſtribute among 25 poor Men, at 7$\frac{1}{2}$*d.* each per Day, and 50 poor Women at 5$\frac{1}{4}$*d.* each, and 60 poor Children at 3$\frac{1}{2}$*d.* each, how long will this Sum relieve them? *Anſwer* 145 Days.

8. A Grocer bought 1*Cwt.* of Tea at 10*s.* 9*d.* per Pound; but it not anſwering in Goodneſs was willing to loſe three Guineas by the whole; what muſt he ſell it at per Ounce? *Anſwer* 7$\frac{1}{2}$*d.* $\frac{9}{16}$.

9. How much Tea, at 56*l.* per Hundred Weight, ſhall I have in lieu for 5*C.* 3*q.* 17*lb.* of Silk, at 16*s.* 9*d.* per Pound? *Anſwer* 9*C.* 3*q.* 15*l.* $\frac{7}{40}$.

10. A Tradeſman dying indebted to three Perſons 520*l.* to A he owed 190*l.* to B 175*l.* and to C 155*l.* but his whole Effects proving to be worth no more than 312*l.* how muſt it be divided in Proportion to the Debt? *Anſwer* A 114*l.* B 105*l.* C 93*l.*

11. If a Ship ſails 96 Miles in 24 Hours, how many Miles will ſhe ſail in ſeven Days with the like Wind? *Anſwer* 672 Miles.

12. A General had 3752*l.* 11*s.* 6*d.* to maintain a certain Number of Soldiers for 3*Y.* 5*m.* 20*d.* allowing 7*d.* per Day to each Man, how many Men will this Sum maintain? *Anſwer* 102 Men.

13. A Merchant from *Holland* delivered at *London* 430*l.* Sterling, to receive 659*l.* *Flemiſh* at *Amſterdam*, what was 1*l.* Sterling valued at in *Flemiſh* Money? *Anſwer* 1*l.* 10*s.* 7$\frac{3}{4}$*d.* $\frac{11}{43}$.

14. Suppoſe a Piece of Ordnance ſpends 15$\frac{1}{2}$*lb.* of Powder at a Charge, how many Pounds will diſcharge her 98 Times and what comes it to at 9$\frac{3}{4}$*d.* per Pound. *Anſwer* 61*l.* 14*s.* 2$\frac{1}{4}$*d.* and 1510*lb.* of Powder.

15. A Draper laid out 350*l.* the one Third in *Iriſh* Cloth, at 1*l.* 12*s.* *per* Piece, the one Third in *Holland,* at 2*l.* 12*s.* *per* Piece, and the reſt in flower'd Linen at 20*d.* *per* Ell *Engliſh,* I demand how much he had of each Sort?

*Anſwer* { 72 $\frac{11}{12}$ Pieces of *Iriſh* Cloth.
44 $\frac{34}{39}$ Pieces of *Holland.*
1400 Ells of Flower'd Linen.

16. A Butcher bought an Ox that weigh'd 99 Stone beſides Skin and Offal, for 11*l.* 12*s.* there were 8 Stone and a Half of Suet that he ſold at 4$\frac{1}{2}$*d.* *per lb.* the Skin and Offal he Sold for 1*l* 3*s* 9*d* how huch might this Beef ſtand him in *per* Stone? *Anſwer* 2*s* 0*d* $\frac{42}{181}$

17. Paid for the Carriage of 4*C.* 2 *qrs.* 12*lb.* 200 Miles, 2*l.* 18*s.* 6*d.* how much muſt I pay for the Carriage of 6*C.* 1*qr.* 14*lb.* after the ſame Rate 86 Miles? *Anſwer* 1*l.* 14*s.* 9$\frac{1}{2}$*d.* $\frac{15}{25}$.

18. A Gentleman having the Care of an Orphan's Eſtate worth 1250*l.* 16*s.* which he kept in his Hands 9 Years, then paid both Principal and Intereſt 1642*l.* 12*s.* at what Rate *per Cent.* did he allow Intereſt for the ſame? *Anſwer* 3*l.* 9*s.* 7$\frac{1}{4}$*d.* $\frac{2072}{9381}$.

19. A Gentleman having a Court-yard to Pave with Bricks of 6 Inches long and 3 broad, which he found would be 480, but altering his Mind he would have it paved with Bricks of 9 Inches long and 4 broad; how many will compleat the Work? *Anſwer* 240.

20. A Cornfactor bought Corn to the Amount of 76*l.* 10*s.* there were 30 Quarters of Wheat at 19*s.* *per* Quarter, and for every 5 Quarters of Wheat he bought 9 of Barley, what Quantity had he of Barley, and what did it coſt him *per* Buſhel? *Anſwer* 2*s* 2$\frac{1}{2}$*d* $\frac{2}{3}$.

21. What is the Exchange and Charges on the four following Bills at 4$\frac{1}{8}$*l* *per Cent*; and what did they fall ſhort of 2000*l* that is 2160 Milreas, at 6*s* $\frac{3}{8}$, each, 129 Florins at 4*s.* 11$\frac{1}{2}$ each, 1300 *Venice* Ducats at 4*s* 9*d* each, 1000 *French* Crowns at 4*s* 6*d* each? *Anſwer* 745*l* 15*s* 4$\frac{1}{2}$*d.*

22. A Gentleman lying on his Death-bed, bequeathed to his Nephew a Guinea and a Noble *per* Day, for his Expences;

but the young Man ſaved 9*s.* 4*d. per* Day out of it, and by that Time he had ſaved enough to buy an Eſtate worth 3000*l.* he died; I deſire to know what Money he had ſpent in that Time, and how long he had been on his Expences? *Anſwer* Spent 5892*l.* 6*s.* 8*d.*, 17 *Ys.* 223 *ds.*

23. A Gentleman bought a Houſe for 1000 Guineas and ſold it again after he had laid out 50*l.* in Repairs, for 1600*l.* what did he make *per Cent.* on his Money, conſidering it was done and ended in 211 Day's Time, and likewiſe what he gained *per Annum?* *Anſwer* 82*l.* 7*s.* $5\frac{1}{2}$*d. per Annum.*

24. A Gentleman ſpends Half his Eſtate in Houſhold Expences $\frac{1}{12}$ in Servant's Wages, Liveries, &c. $\frac{1}{6}$ in Horſes, Hounds, Coaches and other Expences; and ſaves the Remainder to Purchaſe with, which was 1800*l.* what was his whole Eſtate? *Anſwer* 7200*l. per Annum.*

25. Sold 399 Tons of Iron for 1449*l.* whereby I gained 2*l.* $\frac{7}{8}$ *per Cent.* I require what the ſaid Iron coſt me *per* Ton, conſidering 12*l.* $\frac{1}{2}$ *per Cent.* to be a reaſonable Profit; likewiſe what I may be ſaid to have loſt by this Sale? *Anſwer* 4*l.* 11*s.* 1*d.* $\frac{830}{1030}$ *per* Ton, and 139*l.* 9*s.* $3\frac{3}{4}$*d.* $\frac{3}{5}$ loſt by the Sale.

26. A Grocer ſold Tea at 6*s. per lb.* he likewiſe ſold Prunes at 2*l.* and a Noble *per* Cheſt, I deſire to know how many Pounds of Tea is equal to 70 Cheſts of Prunes? *Anſwer* 544*lb.* $\frac{4}{9}$.

27. A Grazier bought five Score of Sheep for 15*s. per* Head, and Sold them afterwards for 1*l.* 1*s.* a Head, what did he gain *per Cent.* admitting the Charges of Keeping to be 9*l.* 18*s.* 7*d*? *Anſwer* 26*l.* 15*s.* $2\frac{1}{2}$*d.* $\frac{2}{3}$.

28. My Correſpondent adviſes me he hath made 247*l.* 11*s.* 6*d.* of 98 Pieces of *Iriſh* Cloth, each 27 Yards, paid Packing and Porterage 2*s.* 6*d. per* Piece, Cuſtom 5*d. per* Yard, Freight 2*l.* 11*s* 9*d.* he in Return ſends me 12 Hhds. of Rum at 18*l. per* Hhd. the Charges of Freight Cuſtom and other Duties amounting to 97*l.* 15*s.* 6*d.* I deſire to know how this Article of Trade ſtood as to Profit and Loſs when brought to a Ballance? *Anſwer* 3*l.* 15*s.* 3*d.* Loſs.

29. Suppoſe a Family conſiſting of 20 People, will drink out 27*l.* 17*s.* 6*d.* worth of Beer in 2 Years, when it is 8*s. per* Barrel, how many, after the ſame Rate of Drinking, will drink out 49*l.* 11*s.* worth in Eleven Weeks? *Anſwer* 335 Men.

30. Suppoſe I lent my Friend 27*l.* 7*s.* on the 20th of *February*, 1760, to pay it me again the 20th of *May* following, and he deſires me to uſe as much of his Money for 20 Weeks, as will Recompence the Favour, what muſt that Sum be? *Anſwer* 17*l.* 11*s.* $7\frac{1}{2}$*d* $\frac{6}{7}$.

31. A Merchant at *London* ſent to his Factor at *Jamaica* 300 Dozen of Shoes at 5*s.* 7*d. per* Pair, 200 Pair of Stockings at 3*s.* 9*d. per* Pair, 400 Yards of Broad Cloth at 1*l.* 6*s. per* Ell *Engliſh*, to have Return from thence $\frac{1}{8}$ in Ginger at 12*d. per* Pound, $\frac{1}{4}$ in Pepper at 1*s.* 6*d. per lb.* $\frac{1}{6}$ in Tobacco, at 2*s. per lb.* and the Reſt in Rum, at 29*l* 19*s per* Pipe, what Quantity of each muſt he have?

| | | *C.* | *qrs.* | *lb.* |
|---|---|---|---|---|
| *Anſwer* | Of Ginger | 32 | 2 | $6\frac{1}{4}$ |
| | Of Pepper | 43 | 1 | $17\frac{2}{3}$ |
| | Of Tobbacco | 21 | 2 | $22\frac{1}{6}$ |
| | In Rum | 22*Ps.* 40*gs* $\frac{}{1198}$ | | |

32. Two Builders A and B gained 211*l.* by a Houſe with which they agreed to buy a Chariot and Pair of Horſes, and to uſe it in Proportion to what each of them had diſburſed, which when ſettled; A was to have it 17 Days to B's 12, I deſire to know what each Man ventured ſince their Profits were computed at 20*l. per Cent.*

| | | £. | *s.* | *d.* |
|---|---|---|---|---|
| *Anſwer* | A | 618 | 8 | $11\frac{1}{2}$ $\frac{10}{29}$ |
| | B | 436 | 11 | $0\frac{1}{4}$ $\frac{19}{29}$ |

33. A Gentleman having 771 Guineas, left in his Family for to diſtribute among his Servants, which he divided into 3 Claſſes, to the Firſt he gave $\frac{1}{2}$, to the Second $\frac{1}{3}$, to the Third $\frac{1}{4}$, the Sum was parted equitably among them, I deſire to know each Claſs's Share.

| | | £. | *s.* |
|---|---|---|---|
| *Anſwer* | 1ſt. | 359 | 2 |
| | 2d. | 239 | 8 |
| | 3d. | 179 | 11 |

34. A, B and C Trading together, gained 2000*l.* which is to be divided according to each Man's Stock, *viz.* as often as A put in 15*l.* B put in 27*l.* and C put in 30*l.* what is each Man's Share of the gain?

*Anſwer*

|  |  | £. | s. | d. |  |
|---|---|---|---|---|---|
| *Anſwer* | A | 416 | 13 | 4 | Share of the Gain. |
|  | B | 750 | 0 | 0 |  |
|  | C | 833 | 6 | 8 |  |

35. If 7*lb.* of Mace, be worth 6*lb.* of Tea, and 12*lb.* of Tea worth 10*lb.* of Coffee, and 20*lb.* of Coffee worth 50*lb.* of Sugar, and 80*lb.* of Sugar to be worth 9*lb.* of Cloves, and 12*lb.* of Cloves worth 100*lb.* of Ginger, and 20*lb.* of Ginger worth 15*lb.* of Pepper, at 9*l.* 8*s.* 6*d.* *per Cwt.* I deſire to know the Value of 1*lb.* of Mace? *Anſwer* 2*s.* 1*d.*

36. A Bricklayer charges 7*l.* a Rod for Work that ſtood him in 5*l.* 16*s.* how muſt the Carpenter charge for a Floor 33 Feet 5 Inches by 24 Feet 5 Inches, that ſtood him in 1*l.* 17*s* *per* Square, to keep the ſame Proportion with the Bricklayer? *Anſwer* 18*l.* 6*s.* 6*d.* $\frac{50}{580}$.

37. A Gentleman being minded to buy an Eſtate of 1200*l.* *per Annum*, at 21 Year's Purchaſe, but is informed by a Friend that there are two Incumbrances upon it, firſt the Eſtate is charged with an Annuity of 150*l.* a Year to a Gentlewoman of 45 Years of Age, whoſe Life may be reckoned at 13½ Years Purchaſe; ſecondly 3*l.* a Month to a Minor of 12 Years of Age, whoſe Life may be deemed at 29½ Years Purchaſe; now ſuppoſe the Attorney at Law to have 50 Guineas to ſecure the Title of the Eſtate, the Regiſter Office and other Fees amounting to 7*l.* 12*s.* 9*d.* what Money muſt the Gentleman draw for to compleat the Purchaſe? *Anſwer* 28347*l.* 2*s.* 9*d.*

38. Suppoſe the Diſtance from *York* to *Hull* be 52 Miles by Water, and two Veſſels ſet out at the ſame Time from each Place to proceed to the other, each being able in a Calm to go 6 Miles an Hour, that from *Hull* is aſſiſted by the Tide 3½ Miles an Hour, and the other retarded 2½ Miles in the ſame Time, how far Diſtant from each Place will they meet?

*Anſwer* { From *Hull* 38
From *York* 14

39. Suppoſe a Perſon borrowed 1429*l.* 6*s.* 8*d.* which he kept 9½ Years and then returned for Principal and Intereſt 2212*l.* 11*s.* 6*d.* at what Rate *per Cent. per Annum*, did he pay, allowing ſimple Intereſt only? *Anſwer* 5*l.* 15*s.* 4*d.*

40. Suppoſe a Captain hath 5821*l.* 10*s.* to maintain 500 Men for 9½ Months, what muſt each Man have *per* Day de-

ducting 15*l.* 18*s.* 9*d.* *per Cent.* for the Payment of Officers and other Charges? *Anſwer* 8$\frac{3}{4}$*d.* $\frac{171}{266}$.

41. Suppoſe a Merchant bought 144 Pieces of Cloth, each Piece containing 32$\frac{5}{8}$ Yards at 15*s* 9*d* *per* Yard; which he ſent to *Spain* to receive from thence *Canary* Wine, and paid for ſeveral Charges, in Shipping his Goods 104*l.* 15*s.* 6*d.* how many Pipes of *Canary* at 38*l.* 18*s.* 8*d.* *per* Pipe muſt be delivered for the broad Cloth, and to gain 500 Marks? *Anſwer* 106 Pipes and 35 Gallons.

42. A Merchant ſent Goods into *France* to the Value of 3219*l* 15*s* upon the Sale of which he gained 31*l* 14*s* 9*d* *per Cent.* which Principal and Gains were returned in Commodities, upon the Sale of which he loſt 12*l.* 11*s.* 8*d.* *per Cent.* what was the Merchant's neat Gain? *Anſwer* 488*l.* 2*s.* 8*d.*

43. A Merchant bought 4 Oxen to Victual his Ship, which weighed beſides Skins and Legs 4021*lb.* and coſt him 89*l.* 18*s.* 10*d.* and in them were 49$\frac{1}{2}$ Stone of Suet, which he ſold for 3$\frac{1}{2}$*d* *per lb.* the Skins and Legs ſold for 3*l.* 18*s.* 10*d.* what did one Pound of Beef coſt him? *Anſwer* 5$\frac{1}{4}$*d.* $\frac{891}{3625}$ Parts of a Farthing.

44. Suppoſe a Merchant bought 15 Butts of Currants, Number and Weight as under, N°. 15, 5 Butts 99*C.* 3*qrs.* 11*lb.* N°. 17, 5 Butts, 87*C.* 0*qrs.* 21*lb.* N°. 21, 5 Butts, 104*C.* 3*qrs.* 17*lb.* Groſs, Tare 14*lb.* *per* 112*lb.* and coſt at firſt 421*l.* 15*s.* 9*d.* and paid for Freight 4*l.* 10*s.* *per* Ton, for Cuſtom 7*s.* 9*d.* *per* hundred, for Lighterage 1*s.* 3$\frac{3}{4}$*d* *per* Hundred, for Wharfage, and Carmen 5$\frac{1}{2}$*d* *per* Hundred, for Porterage and other Charges 3*l.* 17*s.* 6*d.* what did 112 Pounds neat Weight coſt him? *Anſwer* 2*l.* 7*s.* 4*d.*

45. A Mercer bought 69 Pieces of Tammies, each Piece containing 69$\frac{5}{8}$ Yards, and coſt him at the firſt 459*l.* 15*s.* which Pieces he ſent to the Dyers, and paid for Charges 13*s* 9*d* *per* Piece, and each Piece ſhrunk of its Length in Dying 3$\frac{5}{8}$ Yards, what did one Yard of Tammy ſtand him in after Dying? *Anſwer* 2*s.* 2$\frac{1}{2}$d. $\frac{2088}{2277}$.

46. What is the Value of 13 Pieces of Linen, being of Contents and Price as follow, *viz.* 4 Pieces containing 59, 60, 58 and 60$\frac{1}{2}$ Ells at 2*s.* 2*d* *per* Ell, 3 Pieces 60, 56 and 57 Ells at 2*s.* 6*d.* *per* Ell, 4 Pieces 59, 60, 56 and 60 Ells at 3*s.* *per* Ell, and 2 Pieces of 60 and 61 Ells at 3*s.* 4*d.* the Ell? *Anſwer* 102*l.* 15*s.* 5*d.*

47. A Merchant ſold 4 Pieces of Silk containing 67, $24\frac{1}{4}$, $32\frac{1}{3}$ and $27\frac{1}{2}$ Yards at 19*s.* 6*d.* *per* Yard. Received 3 Parcels of Tea weighing as follow $42\frac{1}{3}$, $28\frac{1}{2}$ and $48\frac{1}{6}$ Pounds at 11*s.* 8*d.* *per* Pound, and 36 Moidores, what is remaining due? *Anſwer* 29*l.* 5*s.* $9\frac{1}{2}$*d.*

48. A Merchant goes a Voyage to the *Eaſt-Indies*, and carries with him 1000*l.* in Merchandize, with which he traffics and gets 17 Hhds of Sugar weighing $1\frac{1}{2}$*C.* 12 Dozen of Silk Handkerchiefs, 49 Hhds. of Tobacco, which he ſold at the next Port for 12*l.* a Hhd. which Money he lays out $\frac{1}{3}$ in Rum at 10*l.* *per* Hhd. $\frac{2}{5}$ in Pepper at 20*d.* *per lb.* $\frac{1}{4}$ in Ginger at 45*s.* *per Cwt.* all which he brings to *London* and pays Freight, Cuſtom-houſe Charges, *&c.* 30*l.* for the whole; after which he ſells his Sugar at $14\frac{1}{3}$*l.* *per Cwt.* his Handkerchiefs at 37*s.* *per* Dozen. his Rum at 25*l.* *per* Hhd. his Pepper at $11\frac{3}{8}$*l.* *per Cwt.* his Ginger at 9*d.* *per lb.* I demand the neat Proceed of the Voyage, allowing 60*l.* for his Expences? *Anſwer* 278*l.* 9*s.* $9\frac{3}{4}$*d.*

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## EXCHANGE.

IS the drawing or receiving Money, Weight, Meaſure, of one Country for the like Value of another, by means of a Writing or Inſtrument called a Bill of Exchange in Manner following:

1000 Guilders at 40*d.* each.

*London, Augt.* 3*d* 1760.

At Uſance, Pay this my Firſt Bill of Exchange, (ſecond or Third) not paid to Mr JAMES VANHAMET, or Order on Demand one Thouſand Guilders, Exchange at 35*s.* and 6*d.* *Flemiſh, per l.* Sterling, Value received of Mr. ANTHONY MERDEARNY, which place to Account as *per* Advice from

Your humble Servant

SIMEON JONES.

*To Meſſrs.* Vantrump *and* Co.
*Merchants at* Amſterdam.

1. The Courſe of Exchange being known (and the Way of Reducing the Coin, *&c.*) that any Nation Trades in, to that it exchanges in being underſtood, the Value of a Bill

of Exchange of a Sum of Money, *&c.* to be Exchanged, is found the ſame Way as in caſting up the Amount of any Parcel of Wares.

2. There is generally ſome Difference between the Par and Courſe of Exchange, the Par is the real Money of one Country equal to that of another; thus 100 *Portugal* Milreas make 33*l.* 6*s.* 8*d.* Sterling; but the Courſe of Exchange is ſometimes above and ſometimes under Par; which Variation proceeds from many Cauſes, but moſt commonly from the Quantity of Bills drawn or remitted to any Country.

3. When a Bill is preſented and refuſed for Acceptance it muſt immediately be Noted, and if not paid when due, be returned to the Drawer, or to the Perſon from whom it is received.

4. If a Bill be accepted, but not paid before Sun ſet on the Day it is due, then alſo you muſt proceed as above, on Neglect in either Caſe the Loſs falls on the, Poſſeſſor of the Bill; but if done on the Drawer.

5. Bills are never due, by Cuſtom, until the Days of Grace which in *England* are Three.

6. In Order to compute a Foreign Exchange, it is neceſſary to know firſt the Money the Bill is paid in, ſecondly the Money by which we Exchange. *France* keeps Account in Livres, Sous and Deniers.

*Note*, 12 Deniers make one Sous
20 Sous———1 Livre
3 Livres———1 *French* Crown

## EXAMPLES.

1. How much Sterling Money muſt be paid in *London* for a Bill of Exchange of 438 *French* Crowns, at 56*d. per* Crown? *Anſwer* 102*l.* 4*s.*

2. Bought Wares for a Merchant of *Bourdeaux* amounting to 102*l.* 4*s.* Sterling, for which he ordered to draw a Bill on him; how many *French* Crowns do theſe Wares amount to Exchange at 56*d. per* Crown? *Anſwer* 438 Crowns.

3. How many *French* Crowns will a Bill of 1756*l.* 15*s.* $5\frac{1}{4}$*d* Sterling amount to at $55\frac{3}{8}$*d. per* Crown? *Anſwer* 7614 Crowns.

4. What Sterling Money muſt be paid for a Bill of 8297 Crowns, 3 Sols, 8 Deniers, Exchange at $54\frac{1}{4}$*d.* *per* Crown? *Anſwer* 1875l. 9*s.* $7\frac{1}{2}$*d.* $\frac{308}{720}$.

5. What *French* Money will pay a Bill of 1529*l.* 10*s.* Sterling, Exchange at 53*d.* *per* Crown? *Anſwer* 6926*Crs.* 2*Sos.* 3*Dens.* $\frac{9}{53}$.

6. At $53\frac{1}{4}$*d.* *per* Crown, what muſt be paid for 2294*l.* 5*s.* Sterling? *Anſwer* 10340*Crs.* 16*Sls.* 10*Dens.* $\frac{174}{213}$.

*Holland* keeps their Accounts in Guilders, Stivers and Pennies:

*Note*, 16 Pennies make 1 Stiver,
20 Stivers——1 Guilder, alſo
6 Stivers——1 Shilling
6 Guilders——1 Pound *Flemiſh*.

There is in *Holland* a Diſtinction between Bank and Current Money, that is, Paper and Specie, which Difference is called the Agio, and is commonly about 5 *per Cent.* in Favour of the Bank.

Therefore when a Bank Note is received in Caſh, the Agio is added to it; but when Caſh is paid into the Bank for a Note, it is Subtracted; conſequently Bank Money is made Current by the Intereſt, but Current Money is made Bank by Diſcount.

Foreign Bills are moſt commonly at Uſance, that is, a certain Time from the Date of the Bill to the Time it comes due, which is different according to the Diſtance, *viz.* between *London* and *Amſterdam*, *Paris*, *Hamburgh*, &c. in one Month, between *London* and all Places in *Spain* and *Portugal* two Months, between *London* and *Leghorn*, *Genoa*, *Venice*, &c. three Months.

## EXAMPLES.

1. *Amſterdam* draws on *London* for 273*l.* 17*s.* 3*d.* how many Guilders paid the Bill Exchange at 6*s.* 4*d.* *per* Guilder? *Anſwer* $864\frac{63}{76}$.

2. *London* draws on *Amſterdam* for 3716 Guilders, how much Sterling pays for them Exchange at 35*s.* 6*d.* *per l.* *Flemiſh*? *Anſwer* 348*l.* 18*s.* $4\frac{3}{4}$*d.* $\frac{27}{71}$.

3. What Sterling Money muſt be drawn for Wares bought in *Rotterdam*, amounting to 11715 *Guilders*, 12 *Stivers*, Exchange at 34*s*. 8*d*. *Flemiſh per l.* Sterling? *Anſwer* 1094*l*. 18*s*. $3\frac{3}{4}$*d* $\frac{1}{3}$.

4. My Correſpondent at *Antwerp* deſires me to remit him 1400 Guilders and 12 Stivers; how much Sterling is he accountable for, the Courſe of Exchange being at 39*s*. 6*d*. *Flemiſh per l.* Sterling? *Anſwer* 118*l*. 2*s*. $10\frac{1}{4}$*d*. $\frac{71}{237}$.

*Madrid* and *Cadiz* in *Spain*, alſo *Genoa* and *Leghorn* in *Italy*, Exchange in Dollars, or Pieces of Eight of *Mexico*, and keep their Accounts in Rials and Marvedies, and in *Italy* in Livres, Sols and Deniers.

In *Madrid*, *Cadiz*, &c.

372 Marvedies is——— 1 Rial
8 Rials——————— 1 Piece of Eight

In *Italy*.

12 Deniers is ——— 1 Sol
20 Sols——————— 1 Livre
5 Livres——————— 1 Piece of Eight at *Genoa*.
6 Livres——————— 1 Piece of Eight at *Leghorn*.

EXAMPLES.

1. *London* draws on *Leghorn* for 140*l*. Sterling in Peices of Eight, Exchange at 54*d*. *per* Piece, how many pays the Bill? *Anſwer* $622\frac{8}{9}$ Pieces of Eight.

2. My Agent at *Madrid* adviſes me that he hath ſold Goods for 7000 Pieces of Eight at $50\frac{1}{2}$*d per* Piece, how much Sterling Money muſt I draw for? *Anſwer* 1472*l*. 18*s*. 4*d*.

*Venice* in *Italy* keep their Accounts in Ducats, Groſſes and Solidiz.

*Note*, 6 Solidiz is ——— 1 Groſs.
24 Groſſes ——— 1 Ducat.

EXAMPLES.

1. *London* draws on *Venice* 4400 Ducats at 4*s*. 4*d*. each, how much Sterling pays the Bill? *Anſwer* 953*l*. 6*s*. 8*d*.

2. A Merchant deſires his Factor to remit him 3000*l.* for Ducats at 4*s.* $11\frac{1}{2}$*d* each, how many muſt he have? *Anſwer* $12100\frac{100}{119}$ Ducats.

*Florence* in *Italy* keep their Accounts in Ducatoons.

### EXAMPLES.

1. How much Sterling can I have for 200 Ducatoons, Exchange at 50*d* each? *Anſwer* 41*l* 13*s* 4*d*.

2. How many Ducatoons at 4*s* 6*d* each, can I have for 1001*l* 11*s* $6\frac{1}{2}$*d* Sterling? *Anſwer* $4451\frac{49}{108}$.

*Madeira* with *Oporto*, *Liſbon*, &c. in *Portugal*, keep their Accounts in Reas.

*Note*, 1000 Reas is 1 Milrea.

### EXAMPLES.

1. *London* draws on *Liſbon* for 2000 Milreas at 6*s* 8*d* each, how much Sterling pays the Bill? *Anſwer* 666*l.* 13*s.* 4*d.*

2. *Liſbon* draws on *London* for 4000*l.* 11*s.* how many Milreas at 6*s.* 8*d.* each pays the Bill? *Anſwer* $12001\frac{13}{20}$.

*Franckfort* in *Germany* keep their Accounts in Florins.

### EXAMPLES.

1. How many Florins at $60\frac{1}{2}$*d.* each, can I have for 700*l.* 11*s.* 6*d*? *Anſwer* $2779\frac{17}{121}$.

2. *Franckfort* draws on *London* for 7000 Florins at $49\frac{3}{4}$*d.* each, how much Sterling pays the Bill? *Anſwer* 1451*l.* 0*s.* 10*d.*

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## SIMPLE INTEREST,

IS the Profit allowed by the Borrower to the Lender, after the Rate of ſo much for every 100 Pounds for a Year, and ſo in Proportion for a greater or leſſer Sum; and for a longer or ſhorter Time, and according to the Laws of *England* ought not to exceed 5 Pounds for the Uſe of 100*l.* for One Year, and ſo in Proportion for any Sum and for any Time.

The Ratio of any Rate of Intereſt is found by the following Proportion, for one Pound for a Year, as 100*l.* is to the Rate of Intereſt, ſo is one Pound to the Ratio.

### EXAMPLE.

If 100*l.* in one Year, gains 5*l.* what will 1*l.* gain in the ſame Time? *Anſwer* 100*l.* 5 : 1 : 05; this 4th Term is called the Ratio, and being valued by the Rule given in Decimals will be found one Shilling; and by this Proportion is the following Table made.

A TABLE of RATIO's from the Rate of one Pound One and ¼, &c. to Ten Pounds.

| Rate *per C.* | Ratio's. | Rate *per Cent.* | Ratio's. |
|---|---|---|---|
| 1 | ,01 | 5½ | ,055 |
| 1¼ | ,0125 | 5¾ | ,0575 |
| 1½ | ,015 | 6 | ,06 |
| 1¾ | ,0175 | 6¼ | ,0625 |
| 2 | ,02 | 6½ | ,065 |
| 2¼ | ,0225 | 6¾ | ,0675 |
| 2½ | ,025 | 7 | ,07 |
| 2¾ | ,0275 | 7¼ | ,0725 |
| 3 | ,03 | 7½ | ,075 |
| 3¼ | ,0325 | 7¾ | ,0775 |
| 3½ | ,035 | 8 | ,08 |
| 3¾ | ,0375 | 8¼ | ,0825 |
| 4 | ,04 | 8½ | ,085 |
| 4¼ | ,0425 | 8¾ | ,0875 |
| 4½ | ,045 | 9 | ,09 |
| 4¾ | ,0475 | 9¼ | ,0925 |
| 5 | ,05 | 9½ | ,095 |
| 5¼ | ,0525 | 9¾ | ,0975 |
|  |  | 10 | ,6 |

*N. B.* If you would have the Ratio for one Day, it is found by dividing the Ratio by 365 according to the Rule given in Diviſion of Decimals; and if you multiply that Quotient by any Number you have the Ratio for the Number of Days you multiplied by.

If the Ratio of one Day is required at one *per Cent. per Annum*, it will be found, 0000273926 and ſo of the reſt.

*N. B.* In computing Intereſt 12 Months, reckoning 30 Days one Month; but if Time is not ſo computed, and the given Time conſiſts of odd Months and Days, Reduce the whole into Days, and find the Decimal Parts of a Year equivalent to the Days and work by them.

If you add Unity to any of the Ratio's in the Table, it is then the Amount of one Pound for one Year for that Rate of Intereſt; or if you multiply the Ratio by any Time, and to that Product add Unity, you will have the Amount of one Pound for that Time, ſo that you may make your Ratio a Table of Amounts, which is the Principal and Intereſt in one Sum.

If the Time required is not a Year, find the Aliquot Parts, and take the Proportion of a Year's Intereſt for ſuch Parts by Practice; obſerve the ſame for Money, when it is more or leſs than one Pound, obſerving thoſe Directions and the following Rule; all Queſtions in Simple Intereſt, Factor's Allowances uſually called Commiſſion or Proviſion, Brokage, may be reſolved or anſwered.

## GENERAL RULE.

Multiply the principal Time, and Ratio with one another, and the Product is the Intereſt, (Commiſſion, or Brokage, &c.) to which if you add the Principal the Sum is the Amount.

### EXAMPLES.

1. What is the Intereſt and Amount of 342*l.* at 5 *per Cent. per Annum* for 8 Years? *Anſwer* 136*l.* 16*s.* Intereſt, and the Amount is 478*l.* 16*s.*

2. What is the Intereſt and Amount of 792*l.* at 5 *per Cent. per Annum* for one Year? *Anſwer* 39*l.* 12*s.* Intereſt and Amount 831*l.* 12*s.*

3. What is the Intereſt and Amount of 672*l.* at 4 *per Cent. per Annum* for 6 and ½? *Anſwer* 174*l.* 14*s.* 4¾*d.* Intereſt Amount 846*l.* 14*s.* 4*d.* ¾,2.

4. By Advice from my Factor, I find he has bought Goods upon my Account to the Value of 1502*l.* 00*s.* 6*d.* What will the Commiſſion amount to if I allow him $3\frac{1}{2}$ *per Cent?* Bring the 6*d* into the Decimal of a Pound, and work by the General Rule, and the Anſwer is 52*l.* 11*s.* 5*d.* 01.

5. What comes my Factor's Commiſſion to, when he has bought Goods upon my Account to the Amount of 50[illegible]*l.* 10*s.* When I allow him $2\frac{1}{4}$ *per Cent?* *Anſwer* 113*l.* 12*s.* $3\frac{1}{4}$,2.

6. If my Correſpondent is to have $1\frac{3}{4}$ *per Cent.* what will his Commiſſion amount to at 5638*l.* 2*s.* 8*d.*? *Anſwer* 98*l.* 13*s.* 4*d.* 16.

7. If an Auctioneer is to have 4 Shillings *per Cent.* for ſelling Goods, what muſt he have when he ſells to the Amount of 4905*l.* 1*s.* 6*d?* *Anſwer* 9*l.* 16*s.* 2*d* $\frac{1}{4}$,744.

8. What muſt I give my Broker when he ſells Goods to the Value of 7007*l.* 8*s.* 2*d.* and I allow 7*s.* *per Cent?* *Anſwer* 24*l.* 10*s.* 6*d.*

9. What will 8927*l.* 15*s.* $5\frac{1}{2}$*d* at $5\frac{1}{2}$ *per Cent. per Annum* for 22 Months amount to? *Anſwer* 9827*l* 16*s* $6\frac{1}{2}$*d.* Bring 15*s* $5\frac{1}{2}$*d* into the Decimal of a Pound, and then work by the General Rule.

10. What will 8969*l* 14*s* $5\frac{3}{4}$*d* amount to in 23 Months, at $5\frac{3}{4}$*l* *per Cent. per Annum?* *Anſwer* 9957*l* 18*s* 4*d.*

11. What will 3600*l* amount to in 13 Years at 5 *per Cent. per Annum?* *Anſwer* 5940*l.*

12. What will 568 Pounds amount to for 213 Days at 6 *per Cent. per Annum.* Divide the Ratio by 365 as before directed, and the Quotient will be 00016438356 which is the Ratio for one Day at that Rate of Intereſt; then work by the General Rule, the Anſwer will be 587*l.* 17*s.* 9*d.*

13. What will 9657*l.* 9*s.* $4\frac{3}{4}$*d.* amount to at 4*l.* 17*s.* 9*d.* *per Cent. per Annum,* for 59 Years, 7 Months and 27 Days? *Anſwer* 37812*l* 5*s* $8\frac{1}{2}$*d.*

When the Principal is required this General Rule diſcovers it.

*Rule,* Multiply the Ratio by the Time, to the Product add Unity, by that divide the Amount; and the Quotient is the Principal.

### Examples:

1. What Principal will amount to 874*l* 5*s* in 6 Years, at 5 *per Cent. per Annum?* *Anſwer* 672*l* 10*s.*

2. What Principal will amount to 1104*l* 8*s* 7*d* ,05 in 6½ Years at 4 *per Cent. per Annum? Anſwer* 876*l* 10*s* 7½.

3. What Principal will amount to 100*l* in 4 Years at 5 *per Cent. per Annum? Anſwer* 83*l* 6*s* 8*d.*

4. What Principal will amount to 941*l* 10*s* in ten Years, at 4 *per Cent. per Annum? Anſwer* 672*l* 10*s.*

5. What Principal will amount to 903*l* 5*s* 6*d* ,1785 in 6 Years at 3½ *per Cent. per Annum? Anſwer* 746*l* 10*s* 2¼*d.*

6. What Principal will amount to 843*l* 10*s* 7¼*d* at 3½ *per Cent. per Annum* in 7¼ Years? *Anſwer* 672*l* 16*s.*

7. Suppoſe a Perſon has a Sum of Money, which if he puts out at 5 *per Cent. per Annum* for 5½ Years it will amount to 1000 Pounds, what Sum had he? *Anſwer* 784*l* 6*s* 3*d* ¼,2244.

## REBATE OR DISCOUNT,

Comes under this Rule; for if we call the Sum to be diſcounted a Principal, this Rule will diſcover the preſent Worth.

### EXAMPLES.

8. What is the preſent Worth of 1000 Pound in one Year, at 6 *per Cent? Anſwer* 943*l* 7*s* 11*d* ,094.

9. What is the preſent Worth of 500 Pound for 3 Years at 5 *per Cent? Anſwer* 434*l* 15*s* 7¾*d*,3.

10. What is the preſent Worth of 464 Pound for 4 Years at 4 *per Cent? Anſwer* 400*l.*

11. What is the preſent Worth of a Legacy of 5152*l* payable in one Year, and ¾ Rebate being 4 *per Cent? Anſwer* 4814*l* 19*s* 0¾*d* ,14.

*N. B.* The Proof of theſe Queſtions depends upon the firſt Rule, with this Difference only, there it is called Amount, and here the Sum; ſo that to give the ſame Rule again is needleſs.

### EXAMPLES.

1. If I receive 943*l* 7*s* 11*d* ,094 for a Sum of Money due at the Expiration of one Year, allowing 6 *per Cent.* for preſent Payment, what Sum was due at firſt? *Anſwer* 1000*l.*

2. If I receive 434*l* 15*s* 7¾*d* ,3 for a Sum of Money due in 3 Years, allowing 5 *per Cent.* for preſent Payment, what was the Sum due at firſt? *Anſwer* 500*l.*

3. If I receive 400*l* for a Sum of Money due in 4 Years, allowing 4 *per Cent.* for preſent Payment, what was the Sum due? *Anſwer* 464*l.*

4. Suppoſe one receives 4814*l.* 9*s.* 0¾*d*,14, for a Legacy due in one Year and ¾, allowing 4 *per Cent.* for preſent Payment, what was the Sum due? *Anſwer* 5152*l.*

When the Amount, Principal and Time are given to find the Rate of Intereſt, the following Rule directs.

*Rule,* From the Amount, Subtract the Principal, and divide the Remainder by the Time multiplied by the Principal and the Quotient will be the Ratio.

### EXAMPLES.

1. At what Rate *per Cent.* will 342*l.* amount to 478*l.* 16*s.* to coutinue 8 Years? *Anſwer* at 5 *per Cent.*

2. At what Rate *per Cent.* will 792*l.* amount to 831*l.* 12*s.* in one Year? *Anſwer* at 5 *per Cent.*

3. At what Rate *per Cent.* will 672*l.* amount to 846*l.* 14*s.* 4¾*d*,2 in 6 Years and ½? *Anſwer* at 4 *per Cent.*

4. At what Rate *per Cent.* will 8927*l.* 15*s.* 5½*d* amount to 9827*l.* 16*s.* 6½,4*d* in 22 Months? *Anſwer* at 5½ *per Cent.*

5. At what Rate *per Cent.* will 8969*l.* 14*s.* 5¾*d* amount to 9958*l.* 7*s.* 9*d* ¾,5 in 23 Months? *Anſwer* at 5¾ *per Cent.*

6. At what Rate *per Cent.* will 3600*l.* amount to 5940*l.* in 13 Years? *Anſwer* at 5 *per Cent.*

7. At what Rate *per Cent.* will 568*l.* amount to 587*l.* 17*s.* 9*d.* in 213 Days? *Anſwer* at 6 *per Cent.*

8. If one receives 400*l.* for 464*l.* which would become due in 4 Years at what Rate *per Cent.* was the Diſcount allowed for preſent Payment? *Anſwer* 4 *per Cent.*

9, If one receives 4814*l.* 19*s.* 0¾*d.* for the Sum of 5125*l.* which would have been due in one Year and ¾, at what Rate *per Cent.* was allowed diſcount in conſideration of the preſent Payment? *Anſwer* at 4 *per Cent.*

### *If the* TIME *is required.*

*General Rule,* From the Amount Subtract the Principal and divide the Remainder by the Ratio multiplied by the Principal, and the Quotient is the Time.

EXAMPLES,

## EXAMPLES.

1. In what Time will 342*l.* amount to 478*l.* 16*s.* at 3 *per Cent?* *Anſwer* 8 Years.

2. In what Time will 792*l.* amount to 831*l.* 12*s.* at 5 *per Cent?* *Anſwer* in one Year.

3. In what Time will 672*l.* amount to 846*l.* 14*s.* 4*d.* $\frac{3}{4}$,1 at 4 *per Cent?* *Anſwer* 6 Years and $\frac{1}{2}$.

4. In what Time will 3600 amount to 9540*l.* at 5 *per Cent?* *Anſwer* in 13 Years.

5. In what Time will 8927*l.* 15*s.* 5$\frac{1}{2}$*d.* amount to 9827*l.* 19*s.* 6*d* $\frac{1}{2}$,4 at 5$\frac{1}{2}$ *per Cent?* *Anſwer* 22 Months.

6. In what Time will 8969*l.* 14*s.* 5$\frac{3}{4}$*d.* amount to 9958*l.* 5*s.* 2$\frac{3}{4}$d at 5$\frac{3}{4}$ *per Cent?* *Anſwer* in 23 Months.

7. In what Time will 568*l.* amount to 587*l.* 17*s.* 9*d.* at 6 *per Cent?* *Anſwer* in 213 Days.

8. In what Time will 9657*l.* 9*s.* 4$\frac{3}{4}$*d* amount to 37816*l.* 14*s.* 5*d* at 4*l.* 17*s.* 9*d* *per Cent?* *Anſwer* 59 Years, 7 Months and 27 Days.

## ANNUITIES *or* PENSIONS *in* ARREARS.

Is ſuch when Annuities or Penſions are payable every Year, Half Year or Quarter, and are unpaid for any Number of Payments, allowing ſimple Intereſt at a certain Rate *per Cent. per Annum* for each Payment, from the Time it comes due.

To find the Amount of ſuch Annuity, this is the *Rule.*

Multiply the Time by itſelf, and that Product by the Annuity, from this Subtract the Product of the Annuity multiplied by the Time; and divide the Remainder by 2; this Quotient multiply by the Ratio of the Intereſt; and to this Product add the Time multiplied by the Annuity, and the Sum is the Amount.

## EXAMPLES.

1. If an Annuity of 100*l.* be forborn 6 Years, what will it amount to in that Time, allowing 6 *per Cent?* *Anſwer* 690*l.*

2. If the Payment of a Penſion be omitted for 8 Years, what will be the Amount in that Time, when 6 *per Cent.* is allowed and the Penſion is 80*l.* *per Annum?* *Anſwer* 774*l.* 8*s.*

3. What is the Amount of an Annuity of 150*l.* 10*s.* being forborn 7 Years at 6 *per Cent?* *Anſwer* 1243*l.* 2*s.* 7*d*,2.

4. Suppoſe an Houſe is let upon a Leaſe for 14 Years at 70*l. per Annum.* what is the Amount for that Time at 5 *per Cent.* for the forbearance of Payment? *Anſwer* 1298*l.* 10*s.*

5. Suppoſe a Salary of 500*l. per Annum.* be forborn 9 Years, what is the Amount at 4½ *per Cent?* *Anſwer* 5310*l.*

*N. B.* If the Annuities or Rents, *&c.* are paid Half Yearly, then take ½ the Ratio, ½ the Annuity, Rent, *&c.* and twice the Number of Years. But if the Payments are Quarterly take ¼th of the Ratio, and ¼ of the Annuity, Rent, *&c.* and four times the Number of Years and work as before.

### EXAMPLES.

1. If 100*l.* Annuity payable every Half Year were unpaid 6 Years, what will it amount to in that Time, at 6 *per Cent?* *Anſwer* 699*l.*

2. If 100*l.* Annuity payable every Quarter were unpaid 6 Years, what will it amount to in that Time at 6 *per Cent?* *Anſwer* 703*l.* 10*s.*

### *When the* AMOUNT, RATE *of* INTEREST, *and the* TIME, *are given to find the* ANNUITY.

*Rule,* Divide twice the Amount, by the Square of the Time, multiplied by the Ratio, to which Product add twice the Time; and from that Sum Subtract the Time multiplied by the Ratio, and the Quotient is the Annuity, Penſion, *&c.*

### EXAMPLES.

1. If the Amount of an Annuity for 6 Years at 6 *per Cent.* be 690*l.* what is the Annuity? *Anſwer* 100*l.*

2. If the Amount of a Penſion for 8 Years at 6 *per Cent.* be 774*l.* 8*s.* what is the Penſion? *Anſwer* 80*l.*

3. If the Amount of an Annuity be 1243*l* 2*s.* 7,2*d* for 7 Years at 6 *per Cent.* what is the Annuity? *Anſwer* 150*l* 10*s.*

4. Suppoſe a Houſe to be let upon a Leaſe for 14 Years, and the Amount for that Time is 1298*l.* 10*s.* at 5 *per Cent.* what is the Rent? *Auſwer* 70*l.*

5. If a Salary amounts to 5310*l.* in 9 Years at 4½ *per Cent.* what is the Salary? *Anſwer* 500*l.*

*N. B.* When the Payments are Half Yearly, you muſt divide 4 times the Amount, and if Quarterly 8 times the Amount is your Dividend, and proceed as before.

### EXAMPLES.

1. If the Amount of an Annuity payable Half Yearly, for 6 Year at 6 *per Cent.* be 699*l.* what is the Annuity? *Anſwer* 100*l.*

2. If the Amount of an Annuity payable Quarterly for 6 Years at 6 *per Cent.* be 703*l.* 10*s.* what is the Annuity? *Anſwer* 100*l.*

### *When the* ANNUITY, AMOUNT, *and* TIME *are given to find the* RATE *of* INTEREST.

*Rule,* From twice the Amount, Subtract twice the Annuity multiplied by the Time, and divide the Remainder by the Square of the Time multiplied by the Annuity, made leſs by the Time multiplied by the Annuity, and the Quotient is the Ratio of the Intereſt.

### EXAMPLES.

1. If an Annuity of 100*l.* *per Annum* amounts to 960*l.* in 6 Years what was the Rate *per Cent?* *Anſwer* 6*l.*

2. If a Penſion of 80*l.* *per Annum* amounts in 8 Years to 774*l.* 8*s.* what is the Rate *per Cent?* *Anſwer* 6*l.*

3. If an Annuity of 150*l.* 10*s.* *per Annum,* in 7 Years, amounts to 1243*l.* 2*s.* 7,2*d* what was the Rate *per Cent?* *Anſwer* 6 *per Cent.*

4. If an Houſe lett for 14 Years at 70*l.* a Year, amount to 1298*l.* 10*s.* what is the Rate *per Cent?* *Anſwer* 5*l.*

5. If a Salary of 500l. *per Annum* in 9 Years amounts to 5310*l.* what is the Rate *per Cent?* *Anſwer* 4*l.* $\frac{1}{2}$.

*N. B.* If the Payments are Half Yearly, then from 4 times the Annuity multiplied by the Time, and if Quarterly from 8 times the Amount, Subtract 8 times the Annuity multiplied by the Time and proceed as before.

### EXAMPLES.

1. If an Annuity of 100*l.* *per Annum,* payable Half Yearly,

being forborn 6 Years, amount to 699*l.* I demand the Rate *per Cent ? Anſwer 6l.*

2. If an Annuity of 100*l. per Annum*, payable Quarterly, in 6 Years amount to 703*l.* 10*s.* I demand the Rate *per Cent ? Anſwer 6l.*

### *When the* ANNUITY, AMOUNT *and* RATE *are given to find the* TIME.

*Rule*, Divide 2 by the Ratio, and from the Quotient ſubtract Unity, then ſquare the Remainder, and divide the Square by 4, to this Quotient add twice the Amount, divided by the Annuity multiplied by the Ratio, and extract the Square Root of this laſt Sum. Laſtly from this Root Subtract half of the Number found by dividing 2 by the Ratio, and the remains of this laſt Number is the Time.

### EXAMPLES.

1. In what Time will 100*l. per Annum* amount to 690*l.* at 6 *per Cent ? Anſwer* 6 Years.

2. In what Time will a Penſion of 80*l. per Annum* amount to 774*l.* 8*s.* at 6 *per Cent ? Anſwer* in 8 Years.

3. In what Time will an Annuity of 150*l.* 10*s.* amount to 1243*l.* 2*s.* 7*d*,2 at 6 *per Cent Anſwer* in 7 Years.

4. If an Houſe be lett upon a Leaſe for 70*l. per Annum*, and the Amount be 1298*l.* 10*s.* at 5 *per Cent.* I demand the Time it was lett for? *Anſwer* 14 Years.

5. If a Salary of 500*l per Annum*, in a certain Time at 4½, *per Cent.* amounts to 5310*l* I demand the Time of Forbearance ? *Anſwer* 9 Years.

*N. B.* If the Payments are Half Yearly the Number found will be Half Yearly, and if Quarterly the Number found will be Quarterly.

### EXAMPLES.

1. An Annuity of 100*l.* payable Half Yearly, in a certain Time amounts to 690*l.* at 6 *per Cent.* being allowed for Forbearance, I demand the Time ? *Anſwer* 12 Half, or 6 Years.

2. If an Annuity of 100*l. per Annum*, payable Quarterly, amounts in a certain Time to 703*l.* 10*s.* and 6 *per Cent.* is allowed for Forbearance, I demand the Time ? *Anſwer* 24 Quarters or 6 Years. *To*

## *To find the* PRESENT WORTH *of* ANNUITIES *or* PENSIONS, *&c.*

*Rule,* Square the Time, and multiply the Product by the Ratio; to this add twice the Time, then from this ſubtract the Time multiplied by the Ratio, and this is your Dividend; which divide by twice the Ratio multiplied by the Time, when 2 is added to the Product. Laſtly, Multiply this Quotient by the Annuity, Penſion, *&c.* and the Product is the Preſent Worth.

### EXAMPLES.

1. What is the Preſent Worth of 100*l per Annum* to continue 6 Years, at 5 *per Cent?* *Anſwer* 519*l* 4*s* 7*d* $\frac{1}{4}$,53824.

2. What is 40*l* Yearly Rent, to continue 12 Years, worth in ready Money at 5 *per Cent?* *Anſwer* 382*l* 10*s*.

3. What is a Salary of 60*l per Annum,* to continue 16 Years worth in ready Money, at 4 *per Cent?* *Anſwer* 760*l* 19*s* 6*d* 14592.

4. What is an Annuity of 200*l per Annum* to continue 8 Years worth in ready Money, at 5 *per Cent?* *Anſwer* 1342*l* 17*s* 1*d*. $\frac{1}{2}$ 8524.

*N. B.* When the Annuity, Rent, *&c.* is Paid Half Yearly, take $\frac{1}{2}$ the Ratio, $\frac{1}{2}$ the Annuity, *&c.* and twice the Number of Years; but if Quarterly, take $\frac{1}{4}$ of the Ratio, $\frac{1}{4}$ of the Yearly Rent, and four times the Number of Years, and proceed as before.

### EXAMPLES.

1. What is the Preſent Worth of 100*l per Annum* payable Half Yearly at 5 *per Cent.* and to continue 6 Years? *Anſwer* 525*l*.

2. What is the Preſent Worth of 100*l per Annum,* payable Quarterly, at 5 *per Cent.* and to continue 6 Years? *Anſwer* 527*l* 18*s* 5*d* $\frac{1}{2}$,152.

## *When the* PRESENT WORTH, *the* TIME *and* RATIO, *are given to find the* ANNUITY, RENT, *&c.*

*Rule,* Multiply the Ratio by the Time, and to the Product add Unity, and this is your Dividend; which divide by the Square of the Time, from which Sum ſubtract the Time multiplied by the Ratio. Laſtly, Multiply the Quotient by twice the Preſent Worth, and the Product is the Annuity, *&c.*

## EXAMPLES.

1. There is an Annuity of 6 Years to come, I demand the Yearly Value when the Preſent Worth at 5 *per Cent.* is 519*l* 4*s* 7*d.* $\frac{1}{4}$,53824 ? *Anſwer* 100*l per Annum.*

2. I Demand the yearly Rent of a Houſe 12 Years to come, when the Preſent Worth at 5 *per Cent.* is 382*l.* 10*s* ? *Anſwer* 40*l per Annum.*

3. Suppoſe a Gentleman having a Salary 16 Years to come, at 4 *per Cent.* I demand the yearly Value, when the Preſent Worth is 760*l* 19*s* 6,14592 ? *Anſwer* 60*l per Annum.*

4. What is the yearly Value of an Eſtate 8 Years to come, allowing the Purchaſer 5 *per Cent.* when the Preſent Worth amounts to 1342*l* 17*s* 1*d* $\frac{1}{2}$,8524 ? *Anſwer* 200*l per Annum.*

*N. B.* When the Payments are Half Yearly, you muſt take $\frac{1}{2}$ of the Ratio, and Multiply by 4 times the Preſent Worth ? and if Quarterly you muſt take $\frac{1}{4}$ of the Ratio, and multiply by 8 times the Preſent Worth, and proceed as before.

## EXAMPLES.

1. There is an Annuity to continue 6 Years payable Half Yearly, I demand the Annuity when the Preſent Worth at 5 *per Cent.* is 525*l* ? *Anſwer* 100*l.*

2. There is an Annuity to continue 6 Years payable Quarterly, I demand the Annuity, when the Preſent Worth at 5 *per Cent.* is 527*l* 18*s* 5*d* $\frac{1}{2}$,152 ? *Anſwer* 100*l.*

## *When the* ANNUITY, PRESENT WORTH, *and the* TIME *is given to find the* RATIO.

*Rule,* Multiply twice the Annuity by the Time, from which ſubtract the Preſent Worth, and this is your Dividend. For the Diviſor do thus, multiply twice the Preſent Worth by the Time; then multiply the Square of the Time by the Annuity, and from this Product ſubtract the Time multiplied by the Annuity, then take this Remains from twice the

Preſent Worth multiplied by the Time, and this will be your Diviſor, and the Quotient will be the Ratio.

### EXAMPLES.

1. At what Rate *per Cent.* will the yearly Rent of 100*l* to continue 6 Years, produce the Preſent Worth of 519*l* 4*s* 7*d* $\frac{1}{4}$,53824? *Anſwer* at 5 *per Cent.*

2. At what Rate *per Cent.* will the Yearly Rent of 40*l* to continue 12 Years, produce the Preſent Worth of 382*l* 10*s*? *Anſwer* at 5 *per Cent.*

3. At what Rate *per Cent.* will an Annuity of 200*l per Ann.* to continue 8 Years, produce the Preſent Worth of 1342*l* 17*s* 1*d* $\frac{1}{2}$,8524? *Anſwer* at 5 *per Cent.*

4. At what Rate *per Cent.* will a Salary of 60*l per Annum*, to continue 16 Years, produce the Preſent Worth of 760*l* 19*s* 6,14592? *Anſwer* at 4 *per Cent.*

*N. B.* If the Annuity (or Rent) is paid Half Yearly, take $\frac{1}{2}$ the Annuity, *&c.* and twice the number of Years, and the Quotient will be half the Ratio, if Quarterly take $\frac{1}{4}$ of the Rent, *&c.* and four times the number of Years, and the Quotient will be $\frac{1}{4}$ of the Ratio.

### EXAMPLES.

1. At what Rate *per Cent.* will 100*l per Annum*, payable Half Yearly, to continue 6 Years amount to 525*l*? *Anſwer* at 5*l per Cent.*

2. At what Rate *per Cent.* will 100*l per Annum*, payable Quarterly, and to continue 6 Years, amount to 527*l* 18*s* 5*d* $\frac{1}{2}$,152? *Anſwer* at 5 *per Cent.*

### *When the* ANNUITY, PRESENT WORTH, *and the* RATIO, *are given to find the* TIME.

### RULE,

Firſt, Divide 2 by the Ratio.

Secondly, Divide twice the Preſent Worth by the Annuity, from the Quotient ſubtract Unity.

Thirdly, Subtract this Sum from the firſt Quotient.

Fourthly, Square the Remains and divide that Square by 4.

Fifthly, Multiply the Preſent Worth by 2, and divide the Product by the Annuity multiplied by the Ratio.

Sixthly, Add the two laſt Quotients into one, and extract the Square Root of the Sum.

Laſtly, From this Root ſubtract half the Number found by the third Operation, and the Remains are the Time required.

### EXAMPLES.

1. If 100*l* Yearly Rent, produce the Preſent Worth of 519*l* 4*s* 7*d* ¼,53824 at 5 *per Cent.* what is the Time of its Continuance? *Anſwer* 6 Years.

2. If an Annuity of 40*l* *per Annum* produce the Preſent Worth of 382*l* 10*s* at 5 *per Cent.* how long was it to continue? *Anſwer* 12 Years.

3. If a Salary of 200*l* *per Annum* may be bought for 1342*l* 17*s* 1*d* ½8524, allowing 5 *per Cent.* how long was it to continue? *Anſwer* 8 Years.

4. If an Houſe of 60*l* *per Annum* may be bought for 760*l* 19*s* 6*d* ,14592 allowing 4 *per Cent.* how long was the Leaſe to continue? *Anſwer* 16 Years.

*N. B.* If the Payments are Half Yearly you muſt take ½ the Annuity, Rent, &c. and ½ the Ratio, and work as before, and the Anſwer will be the Number of Half Years.

If Quarterly take ¼ of the Annuity, Rent, &c. and ¼ of the Ratio, and proceed as at Firſt, and the Anſwer will be the Number of Quarterly Payments.

### EXAMPLES.

1. In what Time will an Annuity of 100*l* payable Half Yearly, Produce 525*l* allowing 5 *per Cent?* *Anſwer* 12 Half Years or 6 Years.

2. An Annuity of 100*l* *per Annum*, payable Quarterly, is ſold for 527*l* 18*s* 5*d* ½, 152, allowing 5 *per Cent.* how long was it to continue? *Anſwer* 24 Quarters or 6 Years.

### ANNUITIES, LEASES, &c. *taken in Reverſion,*

### *To find the* PRESENT WORTH, *thus.*

Multiply the Square of the Time by the Ratio, and to the Product add twice the Time, from this ſubtract the Time multiplied by the Ratio, and this is the Dividend; which divide by twice the Product of the Time multiplied by the

Ratio when 2 is added to the Product, and multiply this Quotient by the Annuity, Rent, *&c.* the Product is the Preſent Worth; which divide by the Time before it is to commence multiplied by the Ratio, when the Product is made more by Unity, and the Quotient will be the Anſwer to the Queſtion.

## EXAMPLES.

1. What is the Preſent Worth of 50*l per Annum,* to continue 5 Years, but is not to commence till the end of two Years, allowing 5 *per Cent.* to the Purchaſer? *Anſwer* 200*l.*

2. Suppoſe one has the Promiſe of a Penſion to continue 8 Years of 40*l per Annum*; but it is not to commence till the end of 4 Years, and he is willing to ſell the ſame, allowing 5 *per Cent.* preſent Payment, what is the Worth? *Anſwer* 223*l* 16*s* 2*d*,230.

3. Suppoſe a Legacy of 400*l per Annum,* to continue 12 Years is left to a Perſon of 17 Years of Age, the Time of Payment is to commence when he arrives at the Age of 21 Years; but he ſells the ſame for preſent Money allowing the Purchaſer 5 *per Cent.* what Sum was it worth? *Anſwer* 3187*l* 10*s*.

4. A Perſon left a Relation an Annuity of 100*l per Annum,* to continue 6 Years, but was not to commence till the End of 4 Years; but for preſent Money he ſells the ſame and allows the Purchaſer 6 *per Cent.* what was it ſold for? *Anſwer* 409*l* 3*s* 1*d* $\frac{1}{2}$, 37216.

### *To find the Yearly* INCOME *for an* ANNUITY *in* REVERSION, *having what it is ſold for, the* RATE *of* INTEREST, *and the* TIME *it becomes due, and* CONTINUANCE *given.*

*Rule,* Multiply what it ſold for by the Ratio of the Intereſt, and that Product by the Time before it comes due, and to this add what it ſold for and reverſe the Sum.

Secondly, Multiply the Ratio by the Time it is to continue and to the Product add Unity, which is a Dividend.

Thirdly, Multiply the Square of the Time of the Continuance by the Ratio, and to the Product add twice that Time, and from the Sum ſubtract the ſame Time multiplied by the Ratio, and the Remains is your Diviſor.

Fourthly, The Quotient of this Diviſion multiplied by twice the reſerved Sum, the Product will be Yearly, Annuity, &c. required.

### EXAMPLES.

1. There is the Leaſe of an Houſe taken for 5 Years, but Commences not till the End of 2 Years, and it is ſold for 200*l* preſent Money, allowing 5 *per Cent.* to the Purchaſer, what was the yearly Rent? *Anſwer* 50*l*.

2. Suppoſe one has a Penſion for 8 Years, but it will not Commence till the End of 4 Years, and it is ſold for the preſent Payment of 223*l* 16*s* 2*d*,232, allowing the Purchaſer 5 *per Cent.* what was the Yearly Penſion? *Anſwer* 40*l*.

3. A Perſon has an Annuity to continue 12 Years, but it will not Commence till the End of 4 Years, and for preſent Money it is ſold for 3187*l* 10*s*, allowing the Purchaſer 5 *per Cent.* what was the Yearly Annuity? *Anſwer* 400*l*.

4. A Perſon has an Annuity to continue 6 Years, but it will not Commence till the End of 4 Years; but for preſent Money it is ſold for 409*l* 3*s* 1*d* $\frac{1}{4}$,37216, allowing the Buyer 6 *per Cent.* what was the Yearly Annuity? *Anſwer* 100*l*.

## EQUATION *of* PAYMENTS;

Is when ſeveral Sums of Money to be paid at different Times, are reduced to a mean Time for the Payment of the whole, without Loſs to the Debtor or Creditor, and is commonly found by this Rule. Multiply each Payment by its Time, and divide the Sum of all the Products by the whole Debt, and the Quotient is the equated Time.

### EXAMPLE.

1. A owes B 1000*l* ſo that he muſt Pay him 200*l* in 2 Months, 400*l* in 8 Months, and the reſt in 10 Months; but they agree to reduce the whole to one Payment; in what Time muſt the whole be paid? *Anſwer* 7,6 Months.

*N. B.* In finding the equated Time by this Rule, it is of no Signification to know the Debt if only the proportional Parts of it are known, and the Time when each Payment is to be made; for ſuppoſe any Sum for the Debt, and take ſuch proportional Parts of that Sum, and work by the Rule, and the Quotient will be the equated Time.

### EXAMPLE.

2. B owes C a certain Sum which is to be diſcharged in the following Manner, $\frac{1}{2}$ in 4 Months, $\frac{2}{3}$ in eight Months, and $\frac{1}{6}$ in eleven Months; but they agree to have but one Payment of the whole, the equated Time is required? *Anſwer* 6.5 Months.

By this you may perceive that if the Debt had been 12 Pounds, 24 Pounds, 36 Pounds, or 3600 Pounds, or any other Sum the Anſwer would be the ſame.

### RULE *to find the true* EQUATED TIME.

Divide each Payment by the Ratio multiplied by the Time, when Unity is added to the Product, and the Quotient is the Preſent Worth.

Then add all the Preſent Worths into one Sum and ſubtract it from the whole Debt, and divide the Remains, by the Preſent Worth multiplied by the Ratio, and the Quotient is the true equated Time.

### EXAMPLES.

1. A is indebted to B 1200 Pounds to be paid in the following Manner, 200*l* at the end of three Months, 400*l* at the end of 6 Months, and the reſt at the end of 9 Months; but they agree to have but one Payment, Rebate being made at 5 *per Cent.* the true equated Time is required. *Anſwer* 6,924 Months.

2. A Merchant hath owing him 1000*l* to be paid as follows, 300*l* at the end of 2 Months, 300*l* at the end of 6 Months, and the reſt at the end of 10 Months; but he agrees to take the whole at one Payment, Rebate being made at 6 *per Cent.* the equated Time is required. *Anſwer* 193 Days.

3. M is indebted to N 800*l.* to be paid as follows, 300*l* at the end of 4 Months, 300*l* at the end of 16 Months, and the reſt at the end of two Years or 24 Months; but they agree to have but one Payment of the whole, Rebate being made at 3 *per Cent.* the equated Time is required. *Anſwer* in one Year and 41 Days.

4. L owes M 1200*l* to be paid follows. 400*l* down, 300*l* at the end of 6 Months, and the reſt at the end of 12 Months or one Year; but they agree to have but one Payment of the whole, Rebate to be made at 9 *per Cent.* the equated Time of Payment is required? *Anſwer* 5815 of a Year, or 212 Days.

5. A Merchant bought a Parcel of Cloth upon Truſt valued at 500*l* but by Agreement he was to pay $\frac{1}{2}$ in 4 Months, $\frac{1}{4}$ in eight Months, and the reſt at the end of 12 Months; but they agreed to have but one Payment, Rebate being made at 4,5 *per Cent.* I deſire to know the true equated Time? *Anſwer* 7 Months.

## COMPOUND INTEREST,

Is when a Sum of Money is put out upon Intereſt, and the Intereſt becoming due, and continued in the Hands of the Debtor becomes part of the Principal; Intereſt being reckoned for it from the Time it becomes due; and is called Intereſt upon Intereſt.

To find the Amount of one Pound for one Year at any Rate *per Cent.* as for Inſtance, at 5 and 6 *per Cent.* the Proportion will be in the following Manner.

As 100, 105, 1, 1,05 as 100, 1035, 1, 1,035
As 100, 106, 1, 1,06 as 100, 104 , 1, 1,04

By this it Appears that if you add Unity to the Ratio, that is given in Simple Intereſt, you will have the Amount of one Pound for one Year at that Rate of Intereſt.

Thus having the Amount of one Pound for one Year at any Rate *per Cent.* it leads to find the Amount of any Sum, and for any Number of Years.

Thus the Rule. Multiply the Amount of one Pound at the given Rate *per Cent.* ſo many Times continually into itſelf as are the given Number of Years leſs one, and then multiply the given Principal, and the Reſult of this Multiplication is the Anſwer to your Queſtion.

### EXAMPLES.

1. What Sum will 350*l* amount to at 6 *per Cent.* in 5 Years? *Anſwer* 468*l* 7*s* 6*d* $\frac{3}{4}$793536.

2. What will 272*l* amount to in 6 Years at 5 *per Cent. per Annum? Anſwer* 364*l* 10*s* 1*d*

3. What is the Amount of 1000*l* in 6 Years at 6 *per Cent. per Annum? Anſwer* 1418*l* 10*s* 3,128.

4. What is the Amount of 670*l* at 4 *per Cent. per Annum* for 4 Years? *Anſwer* 783*l* 16*s*.

### *When the* AMOUNT, *the* RATE *of* INTEREST, *and the* TIME *are given to find the* PRINCIPAL.

*Rule,* Divide the Amount, by the Amount of one Pound for the given Time, and the Quotient is the Principal.

### EXAMPLES.

1. What Principal muſt be put to Intereſt 5 Years at 6 *per Cent.* to amount to 468*l* 7*s* 6*d* $\frac{3}{4}$,793536? *Anſwer* 350*l*.

2. What Principal will amount to 364*l* 10*s* 1*d* in 6 Years, at 5 *per Cent. per Annum? Anſwer* 272*l*.

3. What Principal will amount to 1418*l* 10*s* 3*d*,128 in 6 Years, at 6 *per Cent. per Anuum? Anſwer* 1000*l*.

4. What Principal will amount to 783*l*. 16*s* in 4 Years at 4 *per Cent. per Annum? Anſwer* 670*l*.

### *When the* PRINCIPAL, *the* RATE *and* AMOUNT *are given to find the* TIME.

*Rule,* Divide the Amount by the Principal, and that Quotient divide by the Amount of one Pound for one Year continually, till nothing remains, the Number of them Diviſions will be the Time.

### EXAMPLES.

1. In what Time will 350*l* amount to 468*l* 7*s* 6*d* $\frac{3}{4}$793536 at 6 *per Cent. per Annum? Anſwer* 5 Years.

2. In what Time will 272*l* amount to 364*l* 10*s* 1*d* at 5 *per Cent. per Annum? Anſwer* 6 Years.

3. In what Time will 1000*l* amount to 1418*l* 10*s* 3,128 at 6 *per Cent. per Annum? Anſwer* 6 Years.

4. In what Time will 670*l* amount to 783*l* 16*s* at 4 *per Cent. per Annum? Anſwer* 4 Years.

### *When the* PRINCIPAL, AMOUNT *and* TIME *are given to find the* RATE *per Cent.*

*Rule,* Divide the Amount by the Principal, and the Quotient is the Amount of one Pound for the given Time, then extract ſuch Root as the Time denotes, and that Root is the Amount of one Pound for one Year, from which take Unity, and the Remains will be the Ratio *per Cent.* which diſcovers the Rate.

## EXAMPLES.

1. At what Rate *per Cent.* will 350*l* amount to 468*l* 7*s* 6*d* ¾,793536 in 5 Years? *Anſwer* 6 *per Cent.*

2. At what Rate *per Cent.* will 272*l* amount to 364*l* 10*s* 1*d* in 6 Years? *Anſwer* 5 *per Cent.*

3. At what Rate *per Cent.* will 1000*l* amount to 1418*l* 10*s* 3*d*,128 in 6 Years? *Anſwer* at 6 *per Cent.*

4. At what Rate *per Cent.* will 670*l* amount to 783*l* 16*s* in 4 Years? *Anſwer* at 4 *per Cent.*

## *Of* ANNUITIES *or* PENSIONS *in* ARREARS.

When the Annuity or Penſion are given, and the Time it continues, and the Rate *per Cent.* to find the Amount.

*Rule*, Multiply continually the Amount of one Pound for one Year, into itſelf ſo many Times as the number of Years leſs by one; and this Product multiply by the Annuity, and from this ſubtract the Annuity, and divide the Remains by the Ratio leſs one, and the Quotient is the Amount.

## EXAMPLES.

1. What will an Annuity of 40*l per Annum*, payable Yearly amount to at 5 *per Cent.* in 3 Years? *Anſwer* 126*l* 2*s*.

2. What will an Annuity of 200*l per Annum*, payable Yearly amount to in 4 Years at 5 *per Cent.* *Anſwer* 862*l* 0*s* 6*d*.

3. If the Yearly Rent of an Houſe which is 70*l per Ann.* be forborn 6 Years at 4 *per Cent.* what is the Amount? *Anſwer* 464*l* 6*s* 1*d* ¾,95100848.

4. If a Salary of 100*l per Annum*, be omitted 5 Years at 5 *per Cent.* payable Yearly, what is the Amount? *Anſwer* 552*l* 11*s* 3,15.

## *When the* AMOUNT, *the* RATE *per Cent. and the* TIME *are given to find the* ANNUITY, PENSION, *&c.*

*Rule*, Multiply the Amount of one Pound for one Year by the whole Amount, from which ſubtract the whole Amount, and divide the Remains by the Amount of one Pound for one Year, multiplied continually into itſelf, as many Times as the given Numbers of Years leſs one, and from the Product ſubtract Unity, the Quotient will be the Annuity, *&c.*

## EXAMPLES.

1. What Annuity being forborn 3 Years, will amount to 126*l* 2*s* at 5 *per Cent?* *Anſwer* 40*l per Annum.*

2. What Annuity being forborn 4 Years, will amount to 862*l* 0*s* 6*d* at 5 *per Cent?* *Anſwer* 200*l per Annum.*

3. If the Yearly Rent of an Houſe being forborn 6 Years, at 4 *per Cent.* amount to 464*l* 6*s* 1*d* ¾,095100848, what was the Rent? *Anſwer* 70*l per Annum.*

4. If the Payment of a Salary be omitted 5 Years, at 5 *per Cent.* amount to 552*l* 11*s* 3,15, what was the Salary? *Anſwer* 100*l per Annum.*

### *When the* ANNUITY, PENSION, AMOUNT *and* RATE *per Cent. are given to find the* TIME.

*Rule*, Multiply the Amount of one Pound for one Year, by the whole Amount, and to that Product add the Annuity, from this Sum ſubtract the Amount, and divide the Remains by the Annuity; and this Quotient divide continually by the Amount of one Pound for one Year till nothing remains and the Number of ſuch Diviſions is the Time required.

## EXAMPLES:

1. In what Time will an Annuity of 40*l per Annum*, amount to 126*l* 2*s* at 5 *per Cent?* *Anſwer* in 3 Years.

2. In what Time will an Annuity of 200*l per Annum*, amount to 862*l* 0*s* 6*d* at 5 *per Cent?* *Anſwer* in 4 Years.

3. In what Time will an Houſe of 70*l per Annum*, amount to 464*l* 3082823005 at 4 *per Cent?* *Anſwer* in 6 Years.

4. In what Time will a Salary of 100*l per Annum*, amount to 525*l* 11*s* 3,15 at 5 *per Cent?* *Anſwer* in 5 Years.

### *To find the* PRESENT WORTH *of* ANNUITIES, PENSIONS, *&c.*

*Rule*, Divide the Annuity, Penſion, *&c.* by the Amount of one Pound for one Year, multiplied continually by itſelf, ſo many Times as are the given Number of Years leſs one, and ſubtract the Quotient from the Annuity; then divide the Remains by the Ratio leſs one, and the Quotient is the Preſent Worth.

### EXAMPLES.

1. What is the Preſent Worth of 30*l* *per Annum*, to continue 4 Years at 5 *per Cent?* *Anſwer* 106,37852*l*.

2. What is the Preſent Worth of a Penſion of 60*l* *per Annum*, to continue 5 Years, at 5 *per Cent.* *Anſwer* 259,7672*l*.

3. What is the Preſent Worth of a Leaſe of an Houſe for 4 Years to come, of 100*l* *per Annum* at 4 *per Cent?* *Anſwer* 363,6225*l*.

4. What is the Preſent Worth of an Annuity of 90*l* *per Annum*, to continue 5 Years, 4 *per Cent.* being allowed for Preſent Payment? *Anſwer* 400,66425*l*.

*N. B.* If you ſubtract the Preſent Worth from the Product of the Annuity, Rent, *&c.* multiplied by the Number of Years, the Remains may be called the Diſcount.

### *When the* PRESENT WORTH, TIME *and* RATE *are given to find the* ANNUITY, RENT, *&c.*

*Rule*, Multiply the Amount of 1*l* for one Year continually into itſelf as many Times as are the Number of Years, and that Product again by the Preſent Worth.

Then multiply the Amount of one Pound for one Year continually into itſelf as many Times as are the Number of Years leſs by one, and that again by the Preſent Worth; and ſubtract this from the former Product, and divide the Remains by the Amount of one Pound for one Year, multiplied continually into itſelf as many Times as the Number of Years leſs by one, when Unity is ſubtracted from the Product; and the Quotient will be the Annuity, Rent, *&c.*

### EXAMPLES.

1. What Annuity to continue 4 Years, may be bought for 106,37852*l* at 5 *per Cent?* *Anſwer* 30*l*.

2. What Annuity or Penſion to continue 5 Years, may be bought for 259,7672*l* at 5 *per Cent?* *Anſwer* 60*l*.

3. What Penſion or Annuity to continue 4 Years, may be bought for 363,6225*l* at 4 *per Cent?* *Anſwer* 100*l*.

4. What Annuity or Rent to continue 5 Years, may be bought for 400,66425*l* at 4 *per Cent?* *Anſwer* 90*l*.

### *When the* ANNUITY, PRESENT WORTH *and* RATE *are given to find the* TIME.

*Rule*, Let the Annuity, Rent, *&c.* be your Dividend, then add the Preſent Worth and the Annuity together, from this Sum ſubtract the Amount of one Pound for one Year; when it is multiplied by the Preſent Worth, and this is your Diviſor; this Quotient divide continually by the Amount of one Pound for one Year till nothing remain; and the Number of Diviſions is the Time.

### EXAMPLES.

1. What Time may an Annuity of 30*l* *per Annum*, be bought for 106,237852*l* allowing 5 *per Cent.* to the Purchaſer? *Anſwer* 4 Years.

2. What Time may an Annuity of 60*l* *per Annum*, be bought for 259,7672*l*. when 5 *per Cent.* is allowed for preſent Payment? *Anſwer* 5 Years.

3. How long may one have an Annuity of 100*l* *per Annum* for 363,6225*l* allowing 4 *per Cent.* for preſent Payment? *Anſwer* 4 Years.

4. How long may one have an Annuity of 90*l* *per Annum* for 400,66425*l*. allowing 4 *per Cent.* for the preſent Payment? *Anſwer* 5 Years.

### *Of* ANNUITIES, LEASES, &c. *taken in* REVERSION.

### RULE.

Firſt find the Preſent Worth of the yearly Sum at the given Rate and Time of its Continuance, thus multiply the Amount for one Year continually into itſelf as many Times as number of Years continuance leſs by one, by this divide the Annuity, Rent, *&c.* the Quotient ſubtract from the Annuity, *&c.* and divide the Remains by the Ratio leſs one, and the Quotient will be the Preſent Worth.

Then divide the Preſent Worth ſo found, by the Amount of one Pound for one Year, multiplied continually into itſelf ſo many Times as are the Number to come before the Annuity, &c. commences leſs by one, and the Quotient is the Anſwer to your Queſtion.

### EXAMPLES.

1. What is the Preſent Worth of the Reverſion of a Leaſe of 50*l per Annum* to continue for 5 Years, not to commence till the end of 3 Years, allowing 5 *per Cent.* for preſent Payment? *Anſwer* 187,003561*l.*

2. Suppoſe a Perſon had a Leaſe of certain Lands of 76*l per Annum* which has got to continue 5 Years, and he has a mind to renew the Leaſe for 6 Years, to begin when the old one ends, what is the Preſent Worth of the ſaid Leaſe in Reverſion, allowing him 5 *per Cent.* for Preſent Payment? *Anſwer* 494*l* 15*s* 11½*d.*

3. One having a Leaſe of 180*l per Annum*, of which 3 Years are yet to come, is deſirous to renew the Leaſe for 5 Years, to commence when the old one expires; how much muſt he pay down for the ſame, allowing him 5 *per Cent.* for Preſent Payment? *Anſwer* 1004*l* 18*s* 6*d.*

### *Given the Value of the* ANNUITY *and* REVERSION, *the* TIME *before it commences, and the* TIME *it is to continue, with the* RATE *of* INTEREST *to find the* ANNUITY, RENT, &c.

*Rule,* Make uſe of the Time before it commences.

Thus multiply the Amount of one Pound for one Year continually into itſelf, as many Times as are the Number leſs by one, and that Product by the Value of the Annuity, and this laſt will be the Preſent Worth.

Now make uſe of the Time it continues, thus, multiply the Amount of one Pound for one Year continually into itſelf, as many Times as are the Number of Years, and this laſt multiply by the Preſent Worth, and reſerve the Product; then multiply the Amount of one Pound for one Year continually into itſelf, as many Times as are the Number of Years leſs by one, and this by the Preſent Worth; and this Product ſubtract from the reſerved Product, and the Remains divide by the Amount of one Pound for one Year, multiplied into itſelf, as many Times as are the Number of Years leſs by one when Unity is ſubtracted from it, and the Quotient will be the yearly Annuity, Rent, &c.

### EXAMPLES.

1. What Annuity or yearly Rent to be entered upon 3 Years hence, and then to continue 5 Years, may be bought for 187,00356*l* ready Money at 5 *per Cent?* *Anſwer* 50*l*.

2. Suppoſe a Leaſe of certain Lands, which has yet to continue 5 Years; but the Leaſer bought the ſame in Reverſion for 6 Years, to commence when the old Leaſe expired, and paid down for the ſame 494*l* 15*s* $11\frac{1}{2}$*d*, what was the yearly Rent of the ſaid Lands when he was to be allowed 5 *per Cent*. for ſo doing? *Anſwer* 76*l*. *per Annum*.

3. One paid down for a Leaſe 1004*l* 18*s* 6*d* for 5 Years, which was to Commence at the End of 3 Years, how much was the yearly Rent when for the ſaid preſent Payment he was allowed 5 *per Cent?* *Anſwer* 180*l* *per Annum*.

### *When the* PRESENT WORTH *of an* ANNUITY, *the* YEARLY RENT, *and the* TIME *before it commences, and the* RATE *of* INTEREST *are given to find how long it is to continue.*

*Rule*, Multiply the Amount of one Pound for one Year continually into itſelf, as many Times as are the Number of Years before it commences leſs by one, and then multiply that Product by the Preſent Worth, and call it the Amount.

Then for a Diviſor do thus, add the Amount and the yearly Annuity into one Sum, from which ſubtract the Amount, when it is multiplied by the Amount of one Pound for one Year, and divide the yearly Annuity by this, which Quotient divide continually by the Amount of one Pound for one Year till nothing remains, and the Number of each Diviſion will be the required Time.

### EXAMPLES.

1. The Preſent Worth of an Annuity or Leaſe to be entered upon 3 years hence, is 187,00356*l* and the yearly Income is then 50*l* and the Purchaſer is allowed 5 *per Cent*. how long did it continue? *Anſwer* 5 Years.

2. Suppoſe one bought a Leaſe which is not to commence till the End of 5 Years, and the yearly Rent is 76*l* and paid for the ſame 494*l* 15*s* $11\frac{1}{2}$*d* and was to be allowed 5 *per Cent*. how long Time was the Leaſe to continue? *Anſwer* 6 Years.

3. There is a Leaſe of 180*l* *per Annum*, but not to commence till the End of 3 Years, bought for 1004*l* 18*s* 6*d* and

the Purchaſer is to be allowed 5 *per Cent.* for his Money, how long was the Leaſe to continue? *Anſwer* 5 Years.

### *Of Purchaſing* FREEHOLD ESTATES;

That is, ſuch as are to continue for ever.

*Rule*, Divide the yearly Rent by the Ratio (of the Intereſt) leſs one, and the Quotient is the Value of the Eſtate.

### EXAMPLES.

1. An Eſtate of 70*l per Annum* is to be ſold, what is it worth allowing the Buyer 5 *per Cent.* for his Money? *Anſwer* 1400*l.*

2. How much is the Value of an Eſtate of 762*l per Annum* allowing the Buyer 4 *per Cent.* for his Money? *Anſwer* 19050*l.*

### *If the* VALUE *of the* ESTATE *and* RATE *of* INTEREST *are given to find the* YEARLY RENT.

*Rule*, Multiply the Value of the Eſtate by the Ratio of the Intereſt leſs one, and the Product is the yearly Rent.

### EXAMPLES.

1. An Eſtate is bought for 1400 Pounds, and the Buyer is allowed 5 *per Cent.* what is the yearly Rent? *Anſwer* 70*l* a Year.

2. If an Eſtate is bought for 19050*l.* and the Buyer is allowed 4 *per Cent.* what is the yearly Rent? *Anſwer* 762*l.*

### *If the Value of the* ESTATE *and the* YEARLY RENT *be given to find the* RATE *of* INTEREST.

*Rule*, Add the Value of the Eſtate and yearly Rent together, and divide the Sum by the Value of the Eſtate, the Quotient will be the Amount of one Pound for one Year.

### EXAMPLES.

1. If a Freehold Eſtate of 70*l per Annum* be ſold for 1400*l* what was the Rate *per Cent?* *Anſwer* 5 *per Cent.*

2. If a Freehold Eſtate of 762*l per Annum*, be ſold for 19050*l* what was the Rate *per Cent?* *Anſwer* 4 *per Cent.*

*N. B.* If you divide the yearly Rent by the Value of the Eſtate, the Quotient will be the Ratio and Anſwer to the Queſtion.

### *Of* FREEHOLD ESTATES *in* REVERSION.

*Rule,* Firſt divide the yearly Rent by the Ratio of the Intereſt leſs one, and the Quotient will be the preſent Worth; then divide the preſent Worth by the Amount of one Pound multiplied ſo many Times into itſelf leſs by one, as are the Number of Years before the Freehold takes Place, and the Quotient is the Value of the Eſtate in Reverſion.

### EXAMPLES.

1. Suppoſe a Freehold Eſtate of 50*l per Annum,* to commence 4 Years hence, is to be ſold, what is it worth allowing the Buyer 5 *per Cent.* for preſent Payment? *Anſwer* 822,70247*l.*

2. An Eſtate of 780*l per Annum,* to continue for ever is to be ſold, but is not to commence to the Purchaſer till the End of 3 Years, what is the preſent Value, allowing the Buyer 4 *per Cent.* for preſent Payment? *Anſwer* 17588,451*l.*

### *When the* YEARLY RENT *is required.*

*Rule,* Multiply the Amount of one Pound for one Year continually into itſelf, as many Times as are the Number of Years before it commences, and multiply that Product by the Value of the Eſtate, and this will be the Amount.

Then multiply this Amount by the Amount of one Pound for one Year, multiplied by itſelf or ſquared, and from the Product ſubtract the Amount, multiplied by the Amount of one Pound for one Year, and the Remains divide by the Amount of one Pound for one Year, and the Quotient is the yearly Rent.

### EXAMPLES.

1. A Freehold Eſtate to commence at the End of 4 Years is ſold for 822,70247*l,* allowing to the Purchaſer 5 *per Cent.* what is the yearly Rent? *Anſwer* 50*l per Annum.*

2. Suppoſe a Freehold Eſtate is ſold for 17588,451*l,* but was not to commence to the Purchaſer till the End of 3 Years, what is the yearly Rent, allowing the Purchaſer 4 *per Cent?* *Anſwer* 780*l per Annum.*

## *Of* REBATE *or* DISCOUNT:

*Rule,* Multiply the Amount of one Pound for one Year continually into itſelf, as many Times as are the Number of Years leſs by one, and the Product is the Diviſor, then divide the Sum to be diſcounted by it, and the Quotient is the preſent Worth.

### EXAMPLES.

1. What is the preſent Worth of 284*l* 10*s* 6*d* payable 3 Years hence at 5 *per Cent ? Anſwer* 245,694*l*.

2. Suppoſe a Debt of 694*l* 17*s* 6½*d*, payable 3 Years hence; but is agreed to be paid in preſent Money, allowing the Rebate at 4 *per Cent.* what Sum muſt the Creditor receive? *Anſwer* 617,74318*l*.

3. If 286 Pounds be payable in 4 Years, what is the preſent Worth at 5 *per Cent.* Diſcount ? *Anſwer* 235,29208.

### *When the* DEBT *is required:*

*Rule,* Multiply the Amount of one Pound for one Year, as many Times as are the Number of Years leſs by one, and this Product multiply by the preſent Worth, the Reſult will be the Anſwer.

### EXAMPLES.

1. If 245,694179*l* be received for a Debt payable 3 Years hence, Allowance of 5 *per Cent.* was made to the Debtor for preſent Payment, what was the Debt ? *Anſwer* 284*l* 10*s* 6*d*.

2. The Sum of 617,74318*l*. was paid for a Debt, and 4 *per Cent.* was allowed for preſent Payment, it not being due till the End of 3 Years, what was the Debt ? *Anſwer* 694*l* 17*s* 6½.

3. If 235,29208*l* ſatisfy a Debt that was not due till the End of 4 Years, and the Debtor was allowed 5 *per Cent.* for preſent Payment, what was the Debt ? *Anſwer* 286*l*.

### *If the* TIME *is required:*

*Rule,* Divide the Debt by the preſent Worth, and then continually divide the Quotient by the Amount of one Pound for one Year till nothing remain, the Number of theſe Diviſions will be the Anſwer.

## EXAMPLES.

1. A Perſon received the Sum of 245,694179*l* for a Debt of 284*l* 10*s* 6*d* Rebate being made at 5 *per Cent.* I deſire to know in what Time the Debt was payable? *Anſwer* in 3 Years.

2. There is a Debt of 694*l* 17*s* 6½*d* payable at a certain Time, but it is agreed to pay 617,743181*l* down at the Allowance at 4 *per Cent.* to the Debtor for his preſent Money, what Time would the Debt be due if no ſuch Payment was made? *Anſwer* in 3 Years.

3. The Sum of 235,29208*l* was paid down for a Debt of 286*l* and the Debtor was allowed 5 *per Cent.* for preſent Payment, in what Time was the Debt payable? *Anſwer* in 4 Years.

### *When the* RATE *of* INTEREST *is required.*

*Rule,* Divide the Debt by the preſent Worth, and the Quotient will be the Amount of one Pound multiplied ſo many Times continually into itſelf as are the Number of Years leſs by one, then it muſt be extracted by the Rules of Extraction according as the given Time denotes, and the Root is the Amount of one Pound for one Year, and the Anſwer to the Queſtion.

## EXAMPLES.

1. The preſent Worth of 284*l* 10*s* 6*d* payable 3 Years hence, is 245,694179 at what Rate *per Cent.* was the Rebate made? *Anſwer* at 5 *per Cent.*

2. The preſent Worth of 694*l* 17*s* 6½*d* payable in 3 Years is 617,743181*l* at what Rate *per Cent.* was the Rebate made? *Anſwer* at 4 *per Cent.*

3. The Sum of 286*l* is payable in 4 year's Time, and the preſent Worth is 235,2908*l* at what Rate *per Cent.* is the Rebate made? *Anſwer* at 5 *per Cent.*

## The following TABLES ſhew the Amounts of one Pound at the Rate of 3½ *per Cent.* 4 *per Cent.* 5 *per Cent.* and 6 *per Cent. per Annum* Compound Intereſt from 1 Year to 30.

### Firſt, the TABLE of the Amount of one Pound at 3½ *per Cent.*

| *Ys.* | *Amount*, &c. | *Ys.* | *Amount*, &c. |
|---|---|---|---|
| 1 | 1,035 | 16 | 1,73397525 |
| 2 | 1,071225 | 17 | 1,79466438 |
| 3 | 1,10871787 | 18 | 1,85747763 |
| 4 | 1,14752299 | 19 | 1,92248934 |
| 5 | 1,18768629 | 20 | 1,98977646 |
| 6 | 1,22925531 | 21 | 2,05941863 |
| 7 | 1,27227924 | 22 | 2,13149828 |
| 8 | 1,31680901 | 23 | 2,20610071 |
| 9 | 1,36289732 | 24 | 2,28331423 |
| 10 | 1,41059872 | 25 | 2,36323022 |
| 11 | 1,45996967 | 26 | 2,44594327 |
| 12 | 1,51106860 | 27 | 2,53155128 |
| 13 | 1,56395600 | 28 | 2,62015557 |
| 14 | 1,61068446 | 29 | 2,71186101 |
| 15 | 1,67533841 | 30 | 2,80677614 |

## Second, the TABLE of the Amount of one Pound at 4 *per Cent. per Annum.*

| *Ys.* | *Amount*, &c. | *Ys.* | *Amount*, &c. |
|---|---|---|---|
| 1 | 1,04 | 16 | 1,87298119 |
| 2 | 1,0816 | 17 | 1,94790043 |
| 3 | 1,124864 | 18 | 2,02581644 |
| 4 | 1,16985856 | 19 | 2,10684909 |
| 5 | 1,21665290 | 20 | 2,19112305 |
| 6 | 1,26531901 | 21 | 2,27876797 |
| 7 | 1,31593177 | 22 | 2,3699868 |
| 8 | 1,36856904 | 23 | 2,46471542 |
| 9 | 1,42331180 | 24 | 2,56330403 |
| 10 | 1,48024427 | 25 | 2,66583619 |
| 11 | 1,53945404 | 26 | 2,77246963 |
| 12 | 1,60103220 | 27 | 2,88336841 |
| 13 | 1,66507348 | 28 | 3,99870314 |
| 14 | 1,73167641 | 29 | 3,11865126 |
| 15 | 1,80094346 | 30 | 3,24339731 |

Third,

### Third, the TABLE of the Amount of one Pound at 5 *per Cent. per Annum.*

| *Ys.* | *Amount*, &c. | *Ys.* | *Amount*, &c. |
|---|---|---|---|
| 1 | 1,05 | 16 | 2,18287459 |
| 2 | 1,1025 | 17 | 2,29201832 |
| 3 | 1,157625 | 18 | 2,40661923 |
| 4 | 1,21550625 | 19 | 2,52695019 |
| 5 | 1,27628156 | 20 | 2,65329770 |
| 6 | 1,34009564 | 21 | 2,78596259 |
| 7 | 1,40710042 | 22 | 2,92526072 |
| 8 | 1,47745544 | 23 | 3,07152375 |
| 9 | 1,55132822 | 24 | 3,22509994 |
| 10 | 1,62889463 | 25 | 3,38635494 |
| 11 | 1,71033936 | 26 | 3,55567269 |
| 12 | 1,79585633 | 27 | 3,73345632 |
| 13 | 1,88564914 | 28 | 3,92012924 |
| 14 | 1,97993709 | 29 | 4,11613599 |
| 15 | 2,07892808 | 30 | 4,32194239 |

### Fourth, the TABLE of the Amount of one Pound at 6 *per Cent.*

J Buchanor

| *Ys.* | *Amount*, &c. | *Ys.* | *Amount*, &c. |
|---|---|---|---|
| 1 | 1,06 | 16 | 2,5403516847 |
| 2 | 1,1236 | 17 | 2,6927727857 |
| 3 | 1,191016 | 18 | 2,8543391529 |
| 4 | 1,2624796 | 19 | 3,0255995021 |
| 5 | 1,3382255776 | 20 | 3,2071354722 |
| 6 | 1,4185191122 | 21 | 3,3995636005 |
| 7 | 1,5036302590 | 22 | 3,6035374166 |
| 8 | 1,5938480745 | 23 | 3,8197496616 |
| 9 | 1,6894776965 | 24 | 4,0489346413 |
| 10 | 1,7908476965 | 25 | 4,2918707197 |
| 11 | 1,8982985583 | 26 | 4,5493829629 |
| 12 | 2,0121964718 | 27 | 4,8223459407 |
| 13 | 2,1329282601 | 28 | 5,1116866971 |
| 14 | 2,2609039557 | 29 | 5,4183878990 |
| 15 | 2,3965581931 | 30 | 5,7434911729 |

*N. B.* To find the Amount of one Pound for a Half Year, Quarter, or Month, is only taking Half of the Rate *per Cent.* for Half a Year, $\frac{1}{4}$ for a Quarter, $\frac{1}{12}$ for a Month. The Method of calculating theſe Tables are fully explained in the Introduction to Compound Intereſt.

## ARITHMETICAL PROGRESSION,

IS when a Rank of Numbers above two increaſe or decreaſe by the continual Addition or Subtraction of one and the ſame Number, as 3, 5, 7, 9, 11, 13, 15 and 17, 14, 11, 8, 5, 2, are two Ranks of Numbers in Arithmetical Progreſſion; the firſt increaſing by the continual Addition of 2, and the other decreaſing by the continual Subtraction of 3, and ſo of any other. In this Progreſſion five Things are to be diligently required, *viz.* 1ſt. the firſt

Term. 2d. The laſt Term. 3d. The Number of Terms. 4th. The common Difference, and 5thly, the Sum of all the Terms: any three of theſe being given, the other may be found, and the Number of Varieties are Twenty. To find the laſt Term.

*Rule*, Multiply the common Difference by a Number leſs by one than the Number of Terms, and to the Product add the firſt Term, the Sum will be the laſt Term.

### *To find the Sum of the whole* PROGRESSION.

*Rule*, Add the firſt Term to the laſt Term, and multiply that Sum by half the Number of Terms, this Product will be the Sum of the whole Progreſſion.

### EXAMPLES.

1. A Grazier bought 100 Sheep, and agreed to pay for the firſt Sheep 1*s*. for the ſecond 3*s*. ſo increaſe the Price of every Sheep by 3*s*. I demand what the Sheep coſt him? *Anſwer* 747*l* 10*s*.

2. Suppoſe a Perſon bought 80 Bales of Cloth, and agreed to give for the firſt Bale 6*l* for the ſecond 8*l*. and for the third 10*l*. ſo increaſing the Price of each Bale by 2*l*. what did he pay for the laſt Bale, and what did the whole coſt? *Anſwer*, he gave for the laſt Bale 164*l*. and the whole coſt 6800*l*.

3. If 100 Stones are placed in a right Line a Yard diſtant from one another, and the firſt a Yard from the Baſket, how far muſt one go to bring the Stones one by one into the Baſket, and what would be the Difference of the Journey betwixt him and another that was to bring in 200 Stones placed as above, and in the ſame Manner? *Anſwer* the firſt goes 10100 Yards, and the ſecond 40200, ſo that the laſt goes 30100 Yards more than the Firſt, or 17 Miles 18 Yards.

*N. B.* 1760 Yards is one Mile; ſo that dividing the Yards by that Number you get the Miles, and all Queſtions propos'd in this Manner are reſolved by the given Rules.

### *To find the* NUMBER *of* TERMS.

*Rule*, If twice the Sum of the whole Progreſſion be divided by the Sum of the firſt and laſt Terms, the Quotient will be the Number of Terms.

*To*

### *To find the* COMMON DIFFERENCE.

*Rule*, Subtract the leaſt Term from the greateſt, and divide the Remainder by a Number leſs by one than the Number of Terms, and the Quotient will be the common Difference.

4. A Gentleman being indebted to ſeveral Creditors 6480*l* ordered his Steward to diſcharge them at ſeveral Payments, the firſt Payment to be 40*l.* and the laſt 500*l.* I deſire to know the Number of Creditors and Difference between each? *Anſwer* 24 Creditors, and Difference 20*l.*

5. A Gentleman has an Eſtate of 1317*l* 10*s per Annum*, which is left to a Number of Tenants, whoſe Rents are in Arithmetical Progreſſion, but the Number of Tenants he had forgot, and only knows that the greateſt Tenant paid 91*l* 8*s per Annum*, and his leaſt but 14*l per Annum*; how many Tenants had he, and what was the common Difference betwixt every two next? *Anſwer* 25 Tenants, and the Difference 3*l* 4*s* 6*d*.

## GEOMETRICAL PROGRESSION,

IS when the Numbers increaſe or decreaſe by one common Multiplier or Diviſor, thus;

3, 9, 27, 81, 243, 729, increaſed by the common Multiplier three.

128, 32, 8, 2, decreaſed by the common Diviſor four.

There are two Ranks or Series of Numbers in Geometrical Proportion, that is, the firſt contains, or is contained in the ſecond, as many Times as the ſecond contains or is contained in the third, &c.

In this Progreſſion the ſame Things are to be conſidered as in Arithmetical Progreſſion, as the firſt Term, the laſt Term, the Number of Terms, the Ratio or common Difference, or exceſs, and the Sum of all the Terms.

If over a Series of Terms in Geometrical Progreſſion be ſet a Series of Terms in Arithmetical Progreſſion, they are called Indices,

Thus 0, 1, 2, 3, 4, 5, Indices.
4, 8, 16, 32, 64, 128, Terms.

Theſe Indices or Expoments, beginning with a Cypher and placed over any Series in Geometrical Progreſſion, ſhew the Diſtance of any Term from the Firſt.

*Rule* 1ſt. In any Geometrical Progreſſion, if you add the Indices of any 2 Terms, and Multiply the Terms together, and divide the Product by the firſt Term, the Quotient will be the Term anſwering the Sum of Indices you add.

*Rule* 2d. If the laſt Term be multiplied by the Ratio, and from the Product ſubtract the firſt Term, and divide the Remains by one leſs than the Ratio, the Quotient will be the Sum of the whole Progreſſion.

## EXAMPLES.

1. An honeſt Country Farmer brought a String of 20 fine Horſes to *Smithfield*, which a Dealer obſerving, demanded the Price of each, and was anſwered 46*l*. at which he under values them, and ſaid, there was one amongſt them not worth a Farthing; well ſays the Countryman you ſhall have him for a Farthing, if you will give me 3 Farthings for the next, and nine for the next, and 27 for the next, and ſo on to the 20th, and laſt Horſe, take the whole Number; done ſays the Jockey, and there is a Bank Note of a Hundred Pounds to bind the Purchaſe, and get it changed, for a good Part of it will be coming to me. The Queſtion is to know what the Horſes were ſold for, and whether or no the Jockey bit the Farmer? *Anſwer* the Horſes ſold for 3632067*l* 1*s* 8*d*.

In anſwering Queſtions in this Rule, place the Numbers thus,

0, 1, 2, 3, 4, 5, Indices.
1, 3, 9, 27, 81, 243, Terms.

*N. B.* Multiplying 243 by 243, you get the tenth Term, which is the Price of the 11th Horſe, and explains the Meaning of the firſt Rule. The Ratio is the common Multiplier or Diviſor.

2. A Perſon bought 15 Oxen on theſe Conditions, that for the firſt he was to pay three Pence, the next nine Pence, the third for twenty-ſeven Pence, and ſo on in Geometrical Progreſſion; what did the whole coſt? *Anſwer* 89680*l* 13*s* 3*d*.

3. A country Girl being at a Fair, bought herſelf a fine Straw Hat; a Country Fellow (ignorant in Numbers) aſked her what ſhe would ſell it for; ſhe readily anſwered (that as

there were 27 Plats in the Hat) if he would give her a Pin for the firſt Plat, three for the ſecond, 9 for the third, 27 for the fourth, and ſo on till he came to the 26th, he ſhould have the 27th Plat in the Bargain. I demand what ſhe valued her Hat at; remembering there are 16 Pins to a Row, and eight Rows for a Penny? *Anſwer* 827432028*l* 5*s* 3¾*d.*

4. Suppoſe 17 Buſhels of Wheat were ſold thus, 3 Farthings for the firſt Buſhel, 9 for the ſecond, and 27 for the third, and ſo on in Geometrical Progreſſion, what was the Price of the whole? *Anſwer* 201781*l* 10*s* 0¾*d.*

5. Suppoſe an Houſe is ſold on theſe Conditions, being elegantly finiſhed, and conſiſting of 12 Doors on the Ground Floor, that is the Purchaſer is to pay the Builder 4*s* as he enters the firſt Door, 16 at the ſecond Door, and 64 at the third Door, and ſo on in Geometrical Progreſſion to the 12th and laſt Door; what was the Houſe ſold for? *Anſwer* 1118481.

6. An Horſe is ſold on theſe Conditions; the Buyer was to give a Farthing for the firſt Nail, two for the ſecond, four for the third, and ſo on to the 24th and laſt Nail, he having 4 Shoes and ſix Nails in each; what was the Price of the Horſe, and what would it have been if he had had 8 Nails in a Shoe? *Anſwer* the Horſe was ſold for 17476*l* 5*s* 3¾*d.* and this would have been the Price, if 8 Nails in a Shoe 4473924*l* 5*s* 3¾*d.*

## VARIATION OF QUANTITIES.

SHEWS how many ſeveral Ways any Number of Quantities may be varied with reſpect to their Places.

### EXAMPLES.

How many Changes may be rung on 12 Bells.

*Rule,* Multiply them continually one into another, and the laſt Product will be 479001600, the Number of Changes, and Anſwer to the Queſtion,

How many different Poſitions may 8 Men be placed at a Table to dine? *Anſwer* 40320. And ſo of any other Number, which, tho' true, is almoſt incredible.

### COMBINATION *of* QUANTITIES.

1. Suppoſe a Man had 20 Sheep, how many different Parcels of 10 each may be combined together? *Anſwer* 184756.

### *To Anſwer* QUESTIONS *of this Nature.*

*Rule*, The Number of Parcels from Unity upwards muſt be Multiplied together continually for a Diviſor, and ſo many of the 20 as there are Parcels muſt be Multiplied one into another, beginning at 20, *&c.* downward for a Dividend, and the Quotient is the Anſwer.

2. Suppoſe a Gentleman had 15 fine Coach Horſes, and he is deſirous to know how many different Combinations of 6 he can have in that Number? *Anſwer* 5005.

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## ALLEGATION MEDIAL,

IS when the Prices and Quantites are given to find the mean Price, when they are mixed together. *Rule*, As the whole Mixture is to its whole Value, ſo is any Quantity of the Mixture to its proportional Price.

### EXAMPLES.

1. If a Cornfactor mixes 10 Buſhels of Wheat, at 6*s* the Buſhel, with 24 Buſhels of Rye, at 4*s* the Buſhel, with 16 Buſhels of Beans, at 5*s* the Buſhel, and with 36 Buſhels of Barley, at 2*s*. and 6*d* the Buſhel; the Price of one Buſhel is required? *Anſwer* 3*s* 9$\frac{1}{2}$*d*.

2. A Vintner mixed 22 Gallons of, Wine worth 2*s* 4*d per* Gallon, with the like Quantity of Wine worth 3*s* 8*d per* Gallon, and with 22 Gallons worth 4*s* 6*d per* Gallon; the Price of one Gallon of this Mixture is required? *Anſwer* 3*s* 6*d*.

3. A Grocer would mingle 4 Pound of Sugar at 4*d* the Pound, with 12 Pounds at 6*d* the Pound, and with 24*lb* at 9*d* the Pound; the Value of a Pound of this Mixture is required? *Anſwer* 7*d* $\frac{1}{2}$ $\frac{2}{5}$.

4. A Perſon mixed 20 Gallons of Ale at 7*d per* Gallon, with 32 Gallons at 10*d per* Gallon, and with 42 Gallons at 12*d per* Gallon; the Value of one Gallon of this Mixture is required? *Anſwer* 10*d* $\frac{1}{4}$ $\frac{2}{94}$.

5. Suppoſe a Refiner had 15*lb* of Silver Bullion of 8 Oz. fine, and 30*lb* of 7 Oz. fine, and 45*lb* of 6 Oz. fine, and he would melt them all together; the Queſtion is to find what fineneſs one Pound of the Maſs will be? *Anſwer* 6 Oz. 13 Dw. 8 Grs. fine.

6. Suppoſe one mix 3*lb* of Gold of 22 Carracts fine, with 9*lb* of 18 Carracts fine, what fineneſs will one Ounce of this Mixture bear? *Anſwer* 19 Carracts fine.

7. A Hop Merchant hath ſeveral ſorts of Hops, *viz.* one Sort at 2*s* 3*d*, and another 1*s* 9*d*, and another at 1*s* 3*d per lb*, and he would mix an equal Quantity of each together; I demand the Price of one Pound of this Mixture? *Anſwer* 1*s* 9*d*.

8. Suppoſe one mix a certain Quantity of Beans at 4*s* 6*d per* Buſhel, with the like Quantity of Oats at 2*s* 6*d per* Buſhel, what will the Price of a Buſhel of this Mixture be? *Anſwer* 3*s* 6*d*.

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## ALLIGATION ALTERNATE.

THIS I ſhall divide into 3 Varieties, that you may perceive which of the Varieties any Queſtion propoſed falls under.

1ſt Variety is when the Price of the Things you would mix are given, but no Quantity, and it is demanded how much of each we muſt take to ſell one Quantity or Meaſure at a Price propoſed.

*Rule*, Place the Prices one over another, and the propoſed Price againſt them, then link or place like Marks or Letters, thus (*v*) mark one Quarter, then the mean Price, with one leſs, and then take the Difference of each, and the mean Price, and place that Difference againſt the other Quantity which is marked (*v*) alike, and ſo proceed with the reſt.

### EXAMPLES.

1. A Grocer would mix Spices, ſome at 9*d per lb*, ſome at 12*d*, ſome at 24*d*, and ſome at 30*d*. how much of each Sort muſt he take to ſell a Pound for 20*d*. Place them as directed thus.

|  | Price |  |
|---|---|---|
| Mean 20*d* | *a* 9 | 4 |
|  | *b* 12 | 10 |
|  | *a* 24 | 11 |
|  | *b* 30 | 8 |

*N. B.* the Difference is the Anſwer to the Queſtion; or if you multiply the Difference by one common Multiplier, the ſeveral Products would have given Variety of Anſwers; ſo by this he muſt have 4*lb* at 9*d*, 10*lb* at 12*d*. 11*lb* at 24*d*. and 8*lb* at 30*d*. to make the Mixture worth 20*d* the Pound. I have made Uſe of the Letters *a* and *b* inſtead of Linking, which is more expeditious and anſwers the ſame End; you may mark 9, and 30, and 12, and 24, and the Difference would give an Anſwer equally true as the other.

2. Suppoſe one would mix three ſorts of Wine together, one at 24*d per* Quart, another at 16*d* the Quart, and the third at 12*d per* Quart, how much of each Sort muſt he take to ſell a Quart for 18*d*? *Anſwer* 8 Quarts at 24*d*, and 6 Quarts of each of the other, or in that Proportion.

*N. B.* As there is but one Price larger than the mean or required Price, it muſt be marked to each of the other, and the Difference betwixt it and the Mean placed to each, and the Difference betwixt each of the other, and the Mean muſt be added in one Sum, which gives the aforeſaid Anſwer.

3. Suppoſe one had a Mind to mix four kinds of Wheat at the following Prices, one at 4*s* the Buſhel, another at 3*s* 6*d*, another at 3*s*, and the other at 2*s* 2*d* the Buſhel, how many Buſhels of each muſt he have that a Buſhel of the Mixture may be worth 3*s* 3*d*? *Anſwer* 3 Buſhels at 4*s*, 13 Buſhels at 3*s* 6*d*, 9 Buſhels at 3*s*, and 3 Buſhels at 2*s* 2*d*, or in that Proportion.

4. A Grocer would mix three ſeveral ſorts of Tea, one at 18*s* the *lb*, another at 16*s* the *lb*, and a third at 12*s* the *lb*; how much of each Sort muſt he take, that a Pound of the Mixture may be worth 17*s* the Pound? *Anſwer* 6*lb* at 18*s*, the *lb*, and one Pound of each of the other, or in that Proportion.

Variety 2d. Is when the Rules of all the Things are given, and the Quantity of one of them, and the mean Rule of the whole Mixture, to find the ſeveral Quantities of the reſt in Proportion to the given Quantity.

*Rule*, Place them as in the laſt, and take the Differences as before; then ſay, as the Difference againſt the given Quantity is to the reſt of any Difference, ſo is the given Quantity to the Quantities ſought, each to its reſpective Difference.

### EXAMPLES.

1. A Tobacconiſt hath 30*lb* of Tobacco at 24*d* the *lb.* which he would mix with ſome at 12*d*, ſome at 9*d*, and ſome at 7*d* the *lb*, how much of each Sort muſt he take to mix with 30*lb*, that he may ſell a *lb* of the Mixture for 16*d*.

| | | | |
|---|---|---|---|
| 16 | 24 *a* | 4 7 9 | 20 |
| | 12 *a* | 8 | 8 |
| | 9 *a* | 8 | 8 |
| | 7 *a* | 8 | 8 |

Now the Proportion will ſtand thus, if 20 ÷ 8 : : 30 : 12, ſo that he muſt have 12*lb* of each Sort of the other to mix with 30*lb* of the beſt.

2. A Goldſmith hath 20 Ounces of Gold at 20 Carracts fine, and would mix it with ſome at 22 Carracts, and ſome at 24 Carracts fine, how much of 22 and 24 Carracts fine, and how much Alloy muſt he mix with 20 Ounces of Carracts fine to have an Ounce, and conſequently the whole Maſs at 18 Carracts fine.

| | | | |
|---|---|---|---|
| 18 | 20 *a* | 18 | 18 |
| | 22 *a* | 18 | 18 |
| | 24 *a* | 18 | 18 |
| | 0 *a* | 2 4 6 | 12 |

And the Proportion will be as follows.
If 18 18 20 20
As 18 18 20 20
As 18 12 20 $13\frac{1}{3}$

So that you muſt have 20 Ounces of each Quantity of the Gold, and $13\frac{1}{3}$ Ounces of Alloy.

*Note*, Alloy is a Sort of a coarſe Silver, or Copper, or ſome baſe Metal, which Goldſmiths mix Gold or Silver with, to abate the fineneſs.

*N. B.* An Ounce of Gold is divided into 24 Parts, called Carracts, and an Ounce of Silver into 20 Parts are called Penny Weights, and to diſtinguiſh fineneſs of Metals, ſuch Gold as will abide the Fire without Loſs is called 24 Carracts fine; if it loſes four Carracts in Trial it is called 20 Carracts fine.

Silver is valued in Ounces; for a Pound of Silver that loſeth nothing in Trial is called 12 Ounces fine, but if it loſeth 3 Penny Weights, it is then ſaid to be 11 Ounces 17 Penny Weights fine.

3d Variety, Is when the Price of every Thing to be mixed is expreſſed, as well as the mean Rate or Price, and it is required to find how much of each Sort muſt be taken to make up a certain Quantity propounded agreeable to the Mean Rule given.

*Rule*, Proceed as before, then the Proportion will be as the total Sum of the Difference is to the total Quantity given, ſo is any particular Difference to its particular Quantity ſought.

### EXAMPLES.

1. A Merchant would mix 4 Sorts of Wine, of ſeveral Prices, one at 6 Shillings the Gallon, another at 8 Shillings, the third at 11 Shillings, and the other at 15 Shillings *per* Gallon; of theſe he would have a Mixture to contain 50 Gallons, and the Price to be 9 Shillings *per* Gallon, what Quantity muſt he have of each Sort of Wine? Proceed thus,

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 9s | 6 *a* | 2 | Then As | 12 | 50 | 2 | $8\frac{1}{3}$ |
| | 8 *b* | 6 | As | 12 | 50 | 6 | 25 |
| | 11 *a* | 3 | As | 12 | 50 | 3 | $12\frac{1}{2}$ |
| | 15 *b* | 1 | As | 12 | 50 | 1 | $4\frac{1}{6}$ |
| | | 12 | | | | | 50 Poof |

2. A Goldſmith would mix Gold of 24 Carracts fine with ſome of 23, ſome of 22, ſome of 18, ſome of 16, and ſome of 15 Carracts fine, ſo that he may have 100 Ounces of 20 Carracts fine, how much muſt he take of each Sort? *Anſwer*, he muſt take as in the following Manner, beginning with the firſt, and ſo to the laſt.

*Ozs.*
10
20
25
20
15
10
100 Proof

*N. B.* By differently marking them, you have Variety of Anſwers.

## SINGLE POSITION.

THIS diſcovers the Anſwer to the Queſtion demanded by one ſuppoſed Number.

EXAMPLES.

## Examples.

1. A Shepherd being aſked how many Sheep he had in his Flock, anſwered that $\frac{1}{2}$, of the Number being added to $\frac{1}{3}$, and $\frac{1}{4}$ of the ſame Number, the Sum of ſuch Addition would be 195, how many Sheep were in the Flock? *Anſwer* 180.

To anſwer this Queſtion (or any of the like) you may ſuppoſe he had what Number you pleaſe; as for Example, ſuppoſe he had 60 Sheep, then you will find that the Sum of $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$, will be but 65, which according to the Queſtion ſhould have been 195, then ſay by the Rule of Three.

```
If 65———60———195
               60
            ———————
          65)11700(180
             65
            ———————
             520
             520
            ———————
             ..0
            ———————
```

2. A Gentleman being demanded how old he was, anſwered, that $\frac{1}{3}$, $\frac{1}{6}$ and $\frac{1}{12}$ of the Years he had ſeen would make the Sum 28, what was his Age? *Anſwer* 48 Years.

3. A Man having the Fortune to find a Sum of Money, was demanded the particular Number of Pieces, but he gave for Anſwer that $\frac{1}{3}$ when it was added to $\frac{1}{9}$ he found the Number 28, how many Pieces did he find? *Anſwer* 63.

4. A General being demanded the Number of his Men, anſwered that $\frac{1}{3}$ of $\frac{1}{6}$ of his Army amounted to 1260 Men; what Number of Men had he? *Anſwer* 22680.

5. Two Men diſcourſing of the Number of Crowns in their Pockets, one ſays to the other, I know if we put our Crowns together, the $\frac{1}{4}$ and $\frac{1}{8}$ of them will be 36; right ſays the other, for $\frac{1}{3}$, $\frac{1}{4}$ and $\frac{1}{6}$ of them I know to be 72, what Number had they? *Anſwer* 96.

6. A young Gentleman arriving at the Age of 21, was told by his Guardian that his Fortune conſiſted in Caſh to the Amount of 26416*l.* and that his Father had been dead

12 Years, and the Sum he left I have allowed you 5 *per Cent. per Annum* for ſince that Time; only I have deducted 100*l*, *per Annum* for your Education; what Sum was left the Son, by the Father, only ſimple Intereſt? *Anſwer* 16510.

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## DOUBLE POSITION.

IS that which diſcovers the Anſwer to Queſtions in this Rule, by making uſe of two Poſitions, and working by them ſuppoſed Numbers according as the Queſtions direct.

### EXAMPLES.

1. Three Men, A, B and C, were left 591*l* in the following Manner, A, was to have a certain Sum, and B was to have 54*l* more than A, and C 72*l* more than B, what Number of Pounds had each? *Anſwer*, A 137, B 191, and C 263.

To get the Anſwer do thus; ſuppoſe A to have 120*l.* then B muſt have 174*l.* and C 246*l* according to the Queſtion, whoſe Sum ſhould have been 591, which Suppoſition gives an Error of 51*l* too little, then make a Croſs and place it thus,

120 130
X
51 21

Now Suppoſe again A to have 130*l.* B 184*l.* and C 256*l.* this Sum will be but 570*l.* which as before ſhould have been 591*l.* and gives the ſecond Suppoſition an Error of 21*l.* too little, which muſt be placed as you ſee the above ſurnamed Croſs.

Now to get the true Anſwer do thus; multiply croſs ways, that is, 51 by 130, and 21 by 120, and ſubtract the leſs Product from the greater, and the Remains will be your Dividend, that is 4110; then Subtract one Error from the other, that is 21 from 51, and 30 will remain for your Diviſor, and the Quotient will be found 137, the Number of Pounds A muſt have, and by Addition to get B's and C's.

*N. B.* If the Errors are alike, that is, both too little or both too much, you muſt proceed according to the Rule delivered.

But if the Errors are unlike, that is, one too much and the other too little, then add your Products for a Dividend, and your Errors for a Diviſor, and the Quotient will be the Anſwer as before, which you may make Proof of at your Pleaſure.

2. What Number is that which multiplied by 9, and 90 added to the Product, will be equal to the ſame Number multiplied by 14? *Anſwer* 18.

3. Suppoſe an Army whoſe Foot are 8 times the Number of Horſe, and 18,000 Shillings to pay the ſame for one Week, the Horſe received 12 Shillings *per* Man, and the Foot but 3, what was the Number of each? *Anſwer* 500 Horſe and 4000 Foot.

4. A, B and C found a Cheſt containing a certain Number of Pounds, and when they divided the Booty A and B's ſhare amounted to 47 Pounds, B and C's to 88 Pounds, and A's and C's to 71 Pounds, what was the Sum found, and each Man's Share? *Anſwer* the Sum found was 103*l.* A's Share 15*l.* B's Share 32*l.* and C's 56*l.*

5. Two Men, A and B, having each a certain Number of Crowns, ſays A to B, give me 2 of your Crowns and I ſhall have three Times as many Crowns as you will have left; no ſays B, but if you give me 3 of your Crowns we ſhall have an equal Number; how many had each? *Anſwer* A had 13 and B 7.

6. A Perſon left his Eſtate, conſiſting of a certain Number of Guineas, in the following Manner amongſt his 3 Sons; to A he left $\frac{1}{2}$ wanting 60, to B $\frac{1}{3}$ wanting 40, to C the reſt, which was 20 more than B, and 80 leſs than A; what were the Number left, and the Share of each? *Anſwer* 720 were left, and A had 300, B 200, and C 220.

7. Suppoſe a Man was to finiſh a Piece of Work in 60 Days, and every Day he works he is to have 5*s* 6*d.* and every Day he plays he is to forfeit 4*s.* 2*d.* and when the Work was finiſhed he received according to Agreement the Sum of 7*l* 16*s.* how many Days did he work, and how many did he play? *Anſwer* he worked 42 and played 18.

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## EXTRACTION OF THE SQUARE ROOT.

THE Square Root of a Number, is a Number which being multiplied by itſelf, produceth the given Number; or it is a mean proportional betwixt the given Number and Unity.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Root | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Square | 1 | 4 | 9 | 16 | 25 | 36 | 49 | 64 | 81 |

And when the Root of a Number is required, the whole is to find that equal Number of which it is compoſed; ſo if the Root of 49 was required, it would be found to be 7, as you may ſee by the Table, for 7 is the Root or firſt Power, and the Number 49 is called the Square or ſecond Power; there are three Sorts of Numbers to be extracted, firſt, Single as in in the Table, and are compoſed of 9 Digits; Secondly, Compound, and are compoſed of more Figures than one, ſuch as 256 and 38564 compoſed of 16 and 242. Thirdly, Irrational are ſuch Numbers, whoſe Roots cannot be diſcovered by Art, neither in whole Numbers or Fractions; but always will be a Remainder, as no Proportion can be found betwixt an irrational Number and its Root, ſuch Numbers are 3, 5, 17, 19, 21, 75, 1156, 867, *&c.*

## EXAMPLES.

What is the Square Root of 58564?

Firſt place a Point under the Units Place, and omit every other Figure, and you will find the Points to be as you ſee in this Example, and the Number of Points ſhews the Number of Figures the Root will have.

Then take the neareſt Square Number that is the ſame, or to your firſt Point towards the Left Hand, and place it under that Point, and its Roots place as a Quotient, as in Diviſion, and it will ſtand thus,

```
        58564|242
        . . .
        4
       ------
    44)185
       176
      ------
   482)..964
         964
      ------
         ..0
```

Now 2 being the firſt Figure in the Root, I place in the Quotient, and its Square 4 I place under the 5, and the Remains is one; ſo bring down 85, which is called the next Period, and it will be 185, then double the Quotient Figure, and it makes 4; then what Figure you place in the Quotient the ſame muſt be placed to the doubled Figure, and it makes

44

44 your Diviſor, and the Remains will be 9, to which bring down 64, your next Period, and it makes 1964 your Dividend, the double 24 your Quotient, and it makes 48 for your Diviſor; and whatever Figure you place in the Quotient, the ſame, as before, you muſt place to your Diviſor; and the Root will be found, and no Remains, ſo that if you multiply 242 by 242 you will have in the Product 58564, the Proof that the Work is true.

In this Manner you muſt proceed with every Operation, always bringing down two Figures at every Operation; and if the Number to be extracted conſiſts of Decimals, they muſt be an even Number, or made ſo by adding a Cypher or Cyphers at diſcretion, before you begin to Point.

What's the Square Root of 451584? *Anſwer* 672.
What's the Square Root of 69696? *Anſwer* 264.
What's the Square Root of 315844? *Anſwer* 562.
What's the Square Root of 964324? *Anſwer* 982.
What's the Square Root of 2637376? *Anſwer* 1624.
What's the Square Root of 138384? *Anſwer* 372.
What's the Square Root of 7612,5625? *Anſwer* 87,25.
What's the Square Root of 315,0625? *Anſwer* 17,75.
What's the Square Root of 784762? *Anſwer* 885, and a Remains of 1537. Now if to the Remains you add two Cyphers, and proceed as before, you get the Decimals of the Root, continually to every Remains add two Cyphers, and you may have as many Places of Decimals as you like.

But if you would have your Root expreſſed as a Vulgar Fraction, do thus; when you have found the integral Part of the Root, multiply it by 4, and to the Product add the Unity, and that is your Denominator, and the double of the Remainder is your Numerator; by this your Root will be 885 $\frac{3074}{3541}$.

What is the Square Root of 674637? *Anſwer* 821,36289, and a Remainder of 29308479.

Extract the Square Root of $\frac{1}{2}$ to 4 Places of Decimals and it will ſtand thus, 5000000? *Anſwer*, 2236 and a Remainder of 304.

## QUESTIONS *to Exerciſe the* SQUARE ROOT.

**To find a mean Proportional betwixt any two Numbers.**

*Rule,* Multiply the given Numbers together, and extract the Square Root of the Product, which Root will be the mean Proportional ſought.

### EXAMPLES.

What is the Mean betwixt 64 and 49? *Anſwer* 56.

What is the Mean betwixt 144 and 121? *Anſwer* 132.

### *To find the Side of a* SQUARE *equal in* AREA *to any given* SUPERFICES *whatſoever.*

*Rule,* Find the Root of the given Area, and that Root is the Side of the Square ſought.

### EXAMPLES.

If the Area of a Circle be 160, what is the Side of a Square equal in Area to the give Circle? *Anſwer* 12,64911 and a Remainder of 162079, or by the Rule given; if you would have it expreſſed as a Vulgar Fraction it will be 12 $\frac{32}{49}$.

The Area of a Triangle is 784, what is the Side of a Square equal to the ſame? *Anſwer* 28.

Suppoſe a General had an Army of 138384 Men, and he would form them into a Square, how many Men muſt be in Rank and File? *Anſwer* 372; the Number of Rank and File found by extracting the Root of the given Number of Men.

If you would have the Number of Men be double, triple or Quadruple, &c. as many in Rank as in File.

*Rule,* Extract the Square Root of $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, &c. the given Number of Men, and that will be the Number of Men in File, which double, triple, &c. that Number is the Men in Rank.

### EXAMPLES.

Let 8192 be formed into an oblong ſo that the Number of Men in Rank may be double the File; *Anſwer* 64 in File and 128 Men in Rank.

Let 12132 Men be placed ſo that there ſhall be 18 in Rank, how many muſt be in File?

To anſwer Queſtions in this Nature, ſay, by the Rule of Three, as the Number of Men in Rank is to the whole Number of Men, ſo is Unity to the Number of File; ſo this Queſtion will ſtand thus;

As 18 : 12132 :: 1, to 674, the Number of Men in File.

Let it be required to place 6068 Men ſo that they may be 82 in Rank, and 74 in File, and they to ſtand in Order, that is, three Feet diſtant in Rank, and as much in File; the Queſtion is to find how much Ground they ſtand on.

To Anſwer this, or any of the Kind, ſay, by the Rule of Three, as Unity is to the Diſtance, ſo is the Number in Rank leſs by one to a fourth Number; and do the ſame by the File, and multiply the two Numbers found by the Rule of Three together, and the Product will be the Anſwer to the Queſtion, and will ſtand thus,

As 1 : 3 : : 81 : 243
As 1 : 3 : : 73 : 219

And 243 multiplied by 219 gives the Anſwer 53217, and ſo many ſquare Feet of Ground they ſtand on.

*Note*, I have given the two preceding Queſtions a Place here, tho' not belonging to the ſquare Root; and will be found of Uſe in planting Trees, as well as placing Men, you having the Diſtance of Ground betwixt each given.

Suppoſe a Gentleman would Plant on a waſte Piece of Ground 864 young Trees, ſo that the Length ſhall be to the Breadth as 3 to 2, and the Diſtance of each Tree from one another 18 Yards; the Queſtion is, how many Trees muſt be in Length and how many in Breadth, and how many ſquare Yards of Ground they ſtand on.

To reſolve any Queſtion of this Nature do thus; ſay, by the Rule of Three, as the Ratio in Length is to the Ratio in Breadth, ſo is the Number of Trees to a fourth Number, whoſe ſquare Root is the Number in Breadth; and as the Ratio in Breadth is to the Ratio in Length, ſo is the whole Number to a fourth, whoſe Root is the Number in Length; by this you will find the Number in Length 36, and in Breadth 24, and by the laſt Example the Quantity of Ground 260820 ſquare Yards.

Suppoſe a General gives 777*l* 12*s* to reward a certain Number of Men who had ſignalized themſelves in an Action, and they upon Examination of the Money, found that each had received in Value as many four-pences as they were Men in Number, how many Men were there? *Anſwer* 216, found by reducing the Money into four-pences, and extracting the Root of that Sum.

In the 47th Propoſition of the firſt Book of Euclid it is proved, the Square of the Hypothenuſe is equal to the Sum of the Squares of the Baſe and Perpendicular, or the other two Sides.

So by this if we have two Sides given, the third may be found.

### EXAMPLES.

Suppoſe a Tower be 33 Yards high, and it is ſurrounded by a Ditch 44 Yards wide, how long muſt a Line be to reach from the Top of the Tower to the oppoſite Side of the Ditch? *Anſwer* 55 Yards; found by ſquaring the Height of the Tower and the Breadth of the Ditch, and adding the Square into one Sum; the Square Root of which gives the Length of the Line.

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## EXTRACTION OF THE CUBE ROOT.

THE Cube Root of a Number, is ſuch, which being multiplied by itſelf twice, produceth the given Number; thus the Cube Root of 343 is 7, and the Root of 216 will be 6; and ſo of other Numbers, as in the following Table.

| Root | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| Cube | 1 | 8 | 27 | 64 | 125 | 216 | 343 | 512 | 729 |

The Root of any ſingle Number is found by the Table; but if it be a compound Cube Number it muſt be pointed thus; make a Point under the Units Place, and omitting two Points every third Figure, and as many Points as the Number contains, ſo many Figures will your Root contain.

Then take the neareſt Cube Number to your firſt Period to the Left Hand, by the Table, whoſe Root Place in the Quotient, then ſubtract its Cube from the Period, and to the Remainder (if any) bring down three Figures or your next Period, and call it your Dividend, then call your Quotient Figure, with a Cypher joined to it, *r*, and ſquare that Number, and multiply that Square by 3, and this Product call your Diviſor, and proceed as in Diviſion, only with this Difference; call your next Quotient Figure, *e*, and multiply your Diviſor by it, and place it under your Dividend, then multiply the Number you called *r*, by 3, and this Product by the Square of that Figure you called *e*, and place it alſo under the Dividend; laſtly, Cube the Figure you called *e*, and place it under the Dividend, then add the three ſeveral Sums into one and Subtract this laſt from your Dividend, and to the Remainder bring down your next Period, and proceed as before: Examples will make it more plain than a Multitude of Words.

*N. B.* If you take any Number and cube it, and then extract the Root of that Number, it will make the Operation more eaſy, becauſe by this Method you know what the Root ſhould be.

### EXAMPLES.

Cube 672, and it will be found 303464448, then extract the Root of this Number and the Work will ſtand thus,

·   ·   ·<br>
303464448(672<br>
*r* is 60 216

3 *rr* is 10800)87464 the Dividend

75600 this is 3*rre*<br>
8820 this is 3*ree*<br>
343 this is *eee*

*r* is 670 84763 this is the Subducend

3*rr is* 1346700) 2701448 the Dividend

2693400 this is 3*rre*<br>
8040 this is 3*ree*<br>
8 this is *eee*

2701448 Subducend

0

*N. B.* Any two Letters joined together ſignify the Square, as thus; *rr* ſhew that the Number repreſented by *r* muſt be ſquared, and 3*rr* that, that Square muſt be multiplied by 3, and *3rre* that this laſt muſt be multiplied by that Number repreſented by *e* and *eee*, that the Number repreſented by *e* muſt be cubed; the firſt *r* is 60, and the firſt *e* 7, your ſecond *r* is 670, and the ſecond *e* is two, and in this Manner you muſt proceed to change your *r* every Period you bring down, and the *e* is always the laſt Figure you place in the Quotient after the firſt, as you may perceive by obſerving the laſt Example.

What is the Cube Root of 307273580992? *Anſwer* 6748.

What is the Side of a Cubical Veſſel which ſhall contain a Gallon of Ale, it being 282 ſolid Inches? *Anſwer*, 6,557 Inches, and a Remainder of 86709307.

*Note*, When you will have your Root conſiſt of Decimal Places, you muſt always bring down three Decimals, or three Cyphers, to ſupply the Want o Decimals every Period.

What is the Cube Root of 306591,054407? *Anſwer* 67,43, by this you may perceive that the Decimals muſt be 3 Places, 6 Places, 9 or 12, &c. or made ſuch by adding Cyphers.

The Solidity of a Cube is 262,144 Inches, what is the Side of that Cube? *Anſwer* 6,4 Inches.

What is the Cube Root of 12,812904? *Anſwer* 2,34.

What is the Cube Root of 427362, and the Root is to contain 4 Places of Decimals. To anſwer this or the like Queſtions you muſt add 12 Cyphers to the Number given to be extracted according to the Rule delivered, and it will ſtand thus; 427362000000000000, and the Anſwer will be 75,3237, and a Remainder of 9527019169 47.

If 3 Places of Decimals had been required, you then muſt have added nine Cyphers; if two Places, but ſix; and ſo on by threes, if more or leſs Places had been required.

If the Cube Root of any Fraction is required, reduce ſuch Fraction into a Decimal of 3, 6, 9 or 12 Places, &c. as you deſire your Root to be more or leſs exact, and then proceed as before.

What is the Cube Root of $\frac{1}{2}$ the Beginning of the Work to three Places of Decimals? will ſtand thus, ,500000000, and the Anſwer will be found 793, and a Remainder of 1322743.

What is the Cube Root of $\frac{27}{125}$? *Anſwer* $\frac{3}{5}$, found by extracting the Root of the Numerator for a Numerator, and the Denominator for a Denominator, and ſo of any other Fraction that is commenſerable to its Root.

What is the Cube Root of 27 ½ ? this brought to Decimals will ſtand thus, 27,5, and to have it to 3 Places of Decimals I muſt add 8 Cyphers and then it will be for extracting thus, 27,500000000, and the Root will be 3,793, and a Remainder of 1322743 and ſo of any other mixed Number.

To prove if your Work is true do thus;

Cube your Root found, and to the Product found by ſo doing add the Remainder, if any, and that Sum will be the ſame as the Number given to be extracted.

## QUESTIONS *to Exerciſe the* CUBE ROOT.

*Rule*, Like Solids are in Proportion as the Cubes of there like Sides, Diameters, Lines, &c. is to the given Weight, Value, Capacity, &c. ſo is the Cube of the Side, Diameter, Lines, &c. whoſe Weight, Value or Capacity is required to its Weight Value or Capacity.

## EXAMPLES.

If a Bullet, whoſe Diameter is 4 Inches, weighs 9 Pounds, what will a Bullet of the ſame Metal weigh whoſe Diameter is 8 Inches?

Firſt, Cube 4; the Diameter of the Bullet whoſe Weight is given, and it will be 64; then Cube 8, the Diameter of the Bullet whoſe Weight is required, and it will be 512; then ſay by the Rule of Three,

If 64*CD* 9*lb* 512*CD*, the Anſwer will be found 72 Pound.

If the Diameter of a Globe be one Inch, and the Solidity of the ſame ,5238 of an Inch, what is the Solidity of another Globe whoſe Diameter is 10 Inches? Cube the Diameter, then by the Rule of Three it will ſtand thus, if 1*C.D.* Inches, : 5238 Inches, :: 1000 Inches to the Solidity required 523,8 Inches.

If a Globe of Silver of one Inch Diameter be in Value 14,4 Shillings, what is the Value of another Globe of the ſame Silver whoſe Diameter is 4 Inches? *Anſwer* 921,6*s* found as above by cubing the Diameters.

If a Gun whoſe Diameter at the Bore is 3,75 Inches require 4*lb* of Powder for its Charge, what will one whoſe Diameter at the Bore is 6,5 Inches, require for its Charge? *Anſwer* 20,83*lb* of Powder.

If the Diameter of a Piece of Ordnance be 11,5 Inches, and it Weighs 1000*lb.* what will another Piece of Ordnance of the ſame Metal weigh, whoſe Diameter is 8,75 Inches? *Anſwer* 440,484*lb.* Weight.

If a Ship whoſe Burthen is 300 Tons, be 75 Feet in the Keel, what will be the Burthen of another Ship (of the ſame Mould) whoſe Keel is 100 Feet? *Anſwer* 711,111 Ton.

If a Bullet whoſe Diameter is 4 Inches weighs 9*lb.* what is the Diameter of another Bullet of the ſame Metal whoſe Weight is 72*lb*? *Anſwer* 8 Inches. For as the given Weight is to the Cube of its Diameter, ſo is the Weight of the required Diameter to the Cube of the Diameter ſought, whoſe Root is the Anſwer.

If the Diameter of a Globe be one Inch, and the Solidity ,5238 of an Inch, what is the Diameter of another Globe whoſe Solidity is 523,8 Inches? *Anſwer* 10 Inches, found as before.

If a Globe of Silver, of one Inch Diameter, be worth 14,4 Shillings, what will be the Diameter of another Globe of Silver that is in Value 921,6 Shillings? *Anſwer* 4 Inches.

To find the Side of a Cube equal in Solidity to any given Solid, as Globe, Cylinder, Priſm, Cone, *&c.* the Cube Root of the Solid Content gives the Side of the Cube equal to ſuch Globe, Cylinder, Priſm, Cone, *&c.*

To find two mean Proportionals betwixt two given Numbers. *Rule,* Divide the Greater by the Leſs, and extract the Cube Root of the Quotient; which Root multiply by the leaſt of the given Numbers, and the Product will be the leaſt, and it being multiplied by the ſame Root gives the greateſt.

Find two mean Proportionals between 3 and 81. *Anſwer* 9 and 27.

For as 3 : 9 : : 27 : 81.

Find 2 mean Proportionals between 8 and 5832. *Anſwer* 72 and 648.

I agreed with a Plumber to make a Cubic Cyſtern to hold 100 Gallons of Water, I deſire to know the Length of one of its Sides. *Anſwer* 30,438 Inches.

A Malſter agreed with a Carpenter to make him a Square Bing to hold 40 Quarters of Barley, what is the Length of one of its Sides? *Anſwer* 7 Feet 4,3 Inches.

A Cubic Cyſtern, each Side 3 Foot, how many Gallons of of Water will it hold, admitting 282 ſolid Inches to a Gallon? *Anſwer* 165,4468 Gallons.

PRAC-

# PRACTICAL QUESTIONS.

1. A Gentleman at his Death left an Eſtate worth 4591*l.* 10*s.* 11½*d.* bequeaths to his Siſter 1051*l.* to four near Relations 150*l.* each, and 140*l.* to charitable Uſes, and 200*l* to pay his Funeral Expences, the reſt to his Executor; I deſire to know his Share? *Anſwer* 2600*l.* 10*s.* 11½*d.*

2. A Gentleman going to Bath, orders his Steward to diſcharge the following Bills, to the Wine Merchant 120*l.* 16*s.* 9*d.* to the Baker 50*l.* 7*s.* 10*d.* to the Brewer 79*l.* 7*s.* 6*d.* to the Coal Merchant 62*l.* 5*s.* to the Butcher 99*l.* 17*s.* 9*d.* to the Taylor 42*l.* 15*s.* 5*d.* to the Cornchandler 107*l.* 19*s.* 9*d.* and propoſes to take with him 500*l.* how much Money muſt he draw of his Banker? *Anſwer* 1063*l.* 10*s.*

3. A ſays to B I have twice three and twenty Crowns, B ſays to A and I have twice twenty three Crowns; which had the moſt and how many? *Anſwer* B had 20 Crowns more than A.

4. A lent his good Friend B fourſcore and eleven Guineas at one Time, 120 Guineas at another; B pays him 100*l.* at one Time, and 100*l.* 11*s.* at one Month after, I demand what remains due to A? *Anſwer* 21*l.*

5. What is the Value of 1000 Bars of Iron, whoſe total Weight is 27000*lb.* at 15 Shillings the 100*lb*? *Anſwer* 202*l.* 10*s.*

6. Bought one Hhd. and a ½ of Wine for 17*l.* 10*s.* 5¼*d.* what will two Hhds of the ſame Wine coſt? *Anſwer* 23*l.* 7*s.* 3*d.*

7. How long will a Perſon be in ſaving 1000*l.* if he ſaves Half a Guinea *per* Week? *Anſwer* 36 Years, 32 Weeks, 5 Days.

8. Bought a Firkin of Butter containing 56*lb.* for 1*l.* 3*s.* 6*d.* and ſold it out at 5½*d.* *per lb.* what did I gain or loſe by the Sale of it? *Anſwer* 2*s.* 2*d.* gained.

9. Two Farmers, A and B, carried 72*C.* 9*qrs.* 8*lb.* of Cheeſe to *Stirbridge* Fair, which they ſold for 109*l.* 19*s.* 7*d.* the Difference of their Weights 2*C.* 7*qrs.* 14*lb.* and of their Money 5*l.* 17*s.* 6*d.* I demand each Man's Weight of his Goods, and how much Money each received,

| | | £. | *s.* | *d.* | C. | Q. | *lb.* |
|---|---|---|---|---|---|---|---|
| *Anſwer* | A | 57 | 18 | 6½ | 39 | 0 | 11 |
| | B | 52 | 1 | 0½ | 35 | 0 | 25 |

10. If I buy a hundred Weight of Cheeſe for 1*l.* 9*s.* 5*d.*

how much muſt I pay for 17*lb.* at the ſame Rate? *Anſwer* 4*s.* $5\frac{1}{2}$*d.*

11. What will 1 Yard and a Quarter of Cloth coſt when $25\frac{1}{2}$ Yards of the ſame comes to 7*l.* 9*s.* $11\frac{1}{2}$*d* ? *Anſwer* 7*s.* 4*d.* $\frac{43}{51}$.

12. Bought 19 Bales of Silk, each Bale 15 Pieces, and each Piece 142 Yards, and paid 3*l.* 5*s.* 7*d.* for 18 Yards, I demand the Price of the whole at that Rate, and what it ſtood me in *per* Yard?

*Anſwer* { the whole 7372*l.* 13*s.* 2*d.* $\frac{1}{4}$ $\frac{1}{3}$
{ One Yard 3*s.* 7*d.* $\frac{1}{2}$ $\frac{8}{9}$

13. A Grocer bought Sugar at 12*s.* $9\frac{1}{2}$*d.* *per* Pound; what is the Value of 12*C.* 1*qr.* 17*lb.* groſs, Tare 9 Pound *per* 112*lb.* at that Rate? *Anſwer* 817*l.* 7*s.*

14. In 176*C.* 1*qr.* 10*lb.* of Tobacco Groſs, Tare 13*lb.* *per* 112*lb.* Tret 4*lb.* *per* 104*lb.* how much neat Weight? *Anſwer* 149*C.* 3*qrs.* 15*lb.*

15. A Merchant bought 45*C.* 1*qr.* 19*lb.* of Cloves Groſs Weight, Tare 19*lb.* *per* 112*lb.* Tret 4*lb.* *per* 104*lb.* how much neat Weight had the Merchant to pay for, and what Money did the Cloves coſt at 2*s.* $9\frac{1}{4}$*d* *per* Pound? *Anſwer* 562*l.* 17*s.* 10*d.* $\frac{3}{4}$. Weight 36*C.* 1*qr.* 3*lb.*

16. If a Man earns 3*l.* 3*s.* *per* Week, how much may he ſpend *per* Day to have 100*l.* together at the Years End? *Anſwer* 3*s.* 6*d.* a Day.

17. A Perſon ſaid he had 5 Sons, and every one is 3 Years older than his next younger Brother; his eldeſt Son was born when he was 21 Years old, which is now the Age of his youngeſt; I deſire to know the Father's Age? *Anſwer* 54 Years of Age.

18. If a Servant's Wages be 7 Pounds a Year, what is that *per* Day? *Anſwer* $4\frac{1}{2}$*d.* $\frac{30}{73}$.

19. How many Yards of Shalloon of $\frac{1}{2}$ a Yard wide, will be ſufficient to line 7 Yards and three Quarters of Cloth that is one Yard and $\frac{1}{2}$ wide? *Anſwer* $23\frac{1}{4}$ Yards.

20. How many Foot of Matting, of two Foot wide, will cover a Floor 20 Foot wide and 24 Foot long? *Anſwer* 240 Foot.

21. If 12 Inches in Breadth and 12 in Length, make a ſuperficial Foot, how much muſt there go in Length to make a Foot, when the Breadth is but 3 Inches? *Anſwer* 48 Inches.

22. How long will 1000*l.* laſt me if I ſpend no more or

leſs than 3*s.* 6*d.* *per* Day? *Anſwer* 15 Years, 8 Months, 2 Weeks.

23. A Cyſtern which would be filled in 12 Minutes Time by two Pipes both running into it, in 20 Minutes it would be filled by one alone, I deſire to know in what Time it would be filled by the other alone? *Anſwer* 30 Minutes.

24. A Grocer bought 9*C.* 3*qrs.* 10*lb.* of Cloves, Tare 12*lb.* *per* 112*lb.* Tret 4*lb.* *per* 104*lb.* which coſt when Neat 2*s.* 9*d.* *per* Pound, and ſold them again for 159*l.* 17*s.* I deſire to know how much he gained by the whole? *Anſwer*, gained 40*l.* 9*s.* 3*d.*

25. A Linnendraper bought 79 Pieces of Iriſh Cloth for 117*l.* 12*s.* I deſire to know how he muſt ſell them *per* Piece to gain 14*l.* in the laying out 100*l.* at that Rate? *Anſwer* 1*l.* 13*s.* 11$\frac{1}{4}$*d.* *per* Piece.

26. A Merchant bought 7*C* $\frac{1}{2}$ of Pepper, and 5*C.* $\frac{3}{4}$ of Ginger, the Pepper coſt him 14*l.* 19*s.* 7*d.* *per Cwt.* the Ginger 12*l.* 17*s.* 6*d.* *per Cwt.* what is the whole Value and how muſt it be ſold out *per* Ounce to gain 10*l.* by each Sort?

*Anſwer* { the Pepper 1$\frac{3}{4}$*d.* *per* Ounce.
the Ginger 1$\frac{1}{2}$, 6068 *per* Ounce.

27. A Farmer had 245 Acres of Land which he had a mind to divide amongſt his three Sons, he deſired that A might have 44 more than B, and let C have 31 leſs, I deſire to know how many Acres each Son muſt have?

$$\textit{Anſwer}\left\{\begin{array}{lr} \text{A} & 121\frac{1}{3} \\ \text{B} & 77\frac{1}{3} \\ \text{C} & 46\frac{1}{3} \end{array}\right\}\text{Acres}$$

$$\overline{\quad 245 \quad}$$

28. A Farmer let 7 Acres of Wheat to reap at 4*s*: 2*d.* *per* Acre, alſo 40 Acres of Barley to mow, at 2*s.* 9*d.* each, 10 Acres of Oats to mow, at 2*s.* 5*d.* each; there were 5 Reapers and 4 Mowers, I deſire to know how much each Man had to receive?

*Anſwer* { Reapers 0*l.* 5*s.* 10*d.*
Mowers 1*l.* 13*s.* 6$\frac{1}{2}$*d.*

29. A Miller had three Sorts of Flour, 7 Buſhels at 6*s.* *per* Buſhel, 9 Buſhels at 5*s.* *per* Buſhel, 11 Buſhels at 4*s.* 6*d.* *per* Buſhel, I deſire to know what one Peck of this Mixture will be worth? *Anſwer* 1*s.* 3$\frac{1}{6}$*d.* *per* Peck.

30. A certain Man had $\frac{1}{3}$ Part of a Wood, and gave $\frac{2}{5}$ of

his Part to his Son, I demand how much the Son's Part is worth, the whole Wood being valued at 1719*l*? *Anſwer* 229*l.* 4*s.*

31. Admit the Rent of a Houſe to be 30*l.* *per Annum*, and King's Tax 4*s.* in the Pound, what muſt the Landlord pay in Proportion to the Rent, where they are taxed under this Limitation of $\frac{3}{5}$ in the Pound? *Anſwer* 3*l.* 12*s.*

32. Two Travellers ſet out from *London* to *Plymouth*, diſtant 180 Miles, the firſt travels 17 Miles *per* Day; 3 Days after the other follows him, and travels $23\frac{1}{2}$ Miles per Day, how many Miles will they have to go when the latter overtakes the former? *Anſwer* $35\frac{7}{10}$ Miles.

33. One Bought a Horſe, and ſold him again for 45 Guineas, and by ſo doing he loſt 9 *per Cent*; but conſidering his keeping and other Expences, he ought to have gained 19 *per Cent.* how much may he be ſaid to be ſold for leſs than his juſt Value? *Anſwer* 14*l.* 10*s.* 7*d.*

34. In ſome Pariſhes they have a Rule to aſſeſs the Inhabitants $\frac{3}{5}$ of their Rent; now ſuppoſe the Poor Rate be $8\frac{1}{4}$*d.* in the Pound for a Houſe that pays 2*l.* 19*s.* $11\frac{1}{2}$*d.* *per Annum*, I deſire to know the Yearly Rent of that Houſe? *Anſwer* 52*l.* 6*s.* $6\frac{1}{2}$*d.*

35. A Gentleman having three Relations, left 500*l.* to be divided amongſt them, to A he gave 79*l.* more than B, and to B he gave 45*l.* leſs than C, I deſire to know each Man's Share?

| *Anſwer* | £. | *s.* | *d.* |
|---|---|---|---|
| A | 204 | 6 | 8 |
| B | 125 | 6 | 8 |
| C | 170 | 6 | 8 |
| | 500 | 0 | 0 |

36. A Perſon begun the World with a certain Sum of Money, which he imported by Trade Annually a fifth Part, excepting 80*l.* expended for the Uſe of his Family; the ſame he continues every Year except 80*l.* *per Annum*, as before, and at the End of 5 Years found that his Eſtate amounted to 1768*l.* 11*s.* 7*d.* I deſire to know his firſt Stock? *Anſwer* 848*l.* 9*s.* $1\frac{1}{2}$*d.*

37. A Grocer in Trade had in Stock 578*l.* 19*s.* 6*d.* in Book Debts 109*l.* 9*s.* 8*d.* he owed 97*l.* 15*s.* 7*d.* the Expences of his Family 57*l.* 12*s.* 6*d.* yearly, he cleared the firſt Year

73*l.* 14*s.* 5*d.* what was his neat Ballance at the Year's End; *Anſwer* 606*l.* 15*s.* 6*d.*

38. A Farmer making up his Accompts at the Year's End, found that his neat Stock amounted to 789*l.* 19*s.* 11½*d.* he owing his Landlord half a Year's Rent, which was 74*l.* 16*s.* the Land Tax and ſome ſmall Repairs to be deducted 15*l.* 11*s.* 9*d.* when he had ſettled his Accompts he found himſelf worth 1329*l.* 11*s.* 9*d.* I deſire to know how much he had in ready Money? *Anſwer* 480*l.* 7*s.* 6½*d.*

39. A Gentleman making his Will, bequeathed his Eſtate, which amounted to 7000*l.* in the following Manner, to be divided amongſt his 6 Sons; give A ½, B ⅓, C ¼, D ⅕, E ⅙, F ⅐, and deſires his Executor that his Will may be punctually Executed according to his Intention, I deſire to know each Man's Share.

| | | £. | s. | d. |
|---|---|---|---|---|
| *Anſwer* | A | 2197 | 6 | 2¼ |
| | B | 1464 | 17 | 5½ |
| | C | 1098 | 13 | 1 |
| | D | 878 | 18 | 5½ |
| | E | 732 | 8 | 8¾ |
| | F | 627 | 16 | 0½ |
| | | 6999 | 19 | 11½ |

40. One begun the World with a certain Sum of Money, which he improved ſo well by Trade, that in 21 Years at an Average he had cleared 305*l.* *per Annum*; making his Will he left 6000*l.* to his Widow, to his two Sons 1000*l.* each, and 800*l.* to his Daughter, and 60*l.* for his Funeral Expences, I demand his firſt Stock? *Anſwer* 2455*l.*

41. A young Lady having an Eſtate left her of 80*l.* *per Annum*, ſhe being but 9 Years of Age, her Truſtees put out the Money, both Principal and Intereſt Yearly as it came due, at 5 *per Cent.* till ſhe attained to the Age of 21 Years, I deſire to know this Lady's Fortune? *Anſwer* 1273*l.* 7*s.* 4¾*d.*

42. A Tenant being indebted to his Landlord, agreed to pay him nine ſeveral Payments, to be made in Arithmetical Progreſſion; the firſt Payment to be 10*l.* 12*s.* and the laſt to be 40 Guineas; I deſire to know the whole Debt and what each Payment is to be?

| | | | |
|---|---|---|---|
| *Anſwer*, the whole Debt | 236*l.* | 14*s.* | 0*d.* |
| The firſt Payment | 10 | 12 | 0 |
| The ſecond | 14 | 10 | 6 |
| The third | 18 | 8 | 0 &c. till the laſt |

Payment.

43. Divide 75*l.* 17*s.* 6*d.* amongſt 5 Men, A $\frac{3}{32}$, B $\frac{3}{16}$, C $\frac{7}{32}$, D $\frac{1}{8}$, E $\frac{3}{8}$, What is each Man's Share?

| *Anſwer* | | £. | *s.* | *d.* |
|---|---|---|---|---|
| | A | 7 | 2 | $3\frac{1}{2}$ |
| | B | 14 | 4 | $6\frac{1}{4}$ |
| | C | 16 | 11 | $11\frac{1}{4}$ |
| | D | 9 | 9 | $8\frac{1}{4}$ |
| | E | 28 | 9 | $0\frac{3}{4}$ |
| | | 75 | 17 | 6 |

44. Suppoſe a Higgler buys 60*l.* worth of Eggs at 2 for a Penny, and ſells them again at 5 for Two-pence; and buys 30*l.* worth more at 3 a Penny, and ſells them out at 6 for Two-pence, Query what he gained or loſt by Trading? *Anſwer* 12*l.* loſt.

45. There are two Cities diſtant from each other 187 Miles, from which two Perſons A and B ſet out from each City at the ſame Time to meet one another, one travelling at the Rate of 5 Miles in 2 Hours, the other at the Rate of 7 Miles in 4 Hours; I deſire to know how long a Time, and how far when they met each had travelled?

*Anſwer* { A 110 Miles
B 77 Miles } and 44 Hours each.

46. B had $\frac{1}{3}$ Part of a Ship, and ſold $\frac{3}{8}$ of his Part to C, and C ſold $\frac{2}{5}$ of his Part to D; I Demand the Value of D's Part, the whole Ship being valued at 999*l*? *Anſwer* 49*l.* 19*s.* Value of D's Part.

47. Laid out 275*l.* 10*s.* 10*d.* in Wine, at 3*s.* 7*d.* *per* Gallon, which having received damage in Carriage, ſold what remained good at 7*s.* 6*d.* and found my Returns no more than 209*l.* 5*s.* 6*d.* I demand what Quantity was damaged? *Anſwer* 979 Gallons.

48. A Merchant found that his Gains amounted to 40*s.* *per* Day, how much may he ſpend *per* Week to lay up 300*l.* at the Year's End? *Anſwer* 8*l.* 4*s.* $\frac{13}{73}$.

49. A Merchant was poſſeſſed of $\frac{3}{5}$ Share of a Ship, and ſold $\frac{2}{3}$ of his Part therein for 2560*l.* what was the Value of the whole Ship? *Anſwer* 6400*l.*

50. A General having an Army of a certain Number of Men, is determined to divide them in 12 Diviſions in the following Manner; that is, the firſt is to contain two thirds of the whole Number, the ſecond two thirds of them which were left, and ſo on to the 12th and laſt Diviſion, when he found he had one Man left; the Queſtion is to find the Number of Men at firſt? *Anſwer* 531441 Men.

51. What is the Value of 18 Pieces of Holland, each Piece containing 39 $\frac{11}{18}$ Ells *Flemiſh*, when it is ſold at 5*s.* the Ell *Engliſh*? *Anſwer* 106*l.* 19*s.*

52. A Gentleman took a Leaſe of a Houſe for 72 Years, and being aſked how much of the Time was expired, he made this Anſwer, that $\frac{3}{4}$ of the Time paſt was equal to $\frac{7}{9}$ of the Time to come; I demand the Time paſt, and the Time to come.

Years.
*Anſwer* { the Time paſt 35 $\frac{76}{220}$.
the Time to come 36 $\frac{36}{55}$.
72 Years.

53. Some merry Companions ſpent at a Reckoning 12*l.* 3*s.* and every Man paid as many Nine-pences as there were Men in Company, I demand the Number of Men? *Anſwer* 18 Men.

54. Two Countrymen going to Market, A with 62*l.* and B with 28*l.* about them, met a Company of Robbers who took twice as much from A as from B, and left A thrice as much as they left B, I demand what they took from each?

*Anſwer* { A 44*l.*
B 22*l.*

55. There is a Piece of Land of 20 Perches ſquare, worth 30*l.* there is another Piece of Land of the ſame Goodneſs worth 67*l.* 10*s.* how many Perches ſquare ought that to be? *Anſwer* 30 Perches.

56. A Man ſaid to another, I think you had 2000 Lambs; ſo I had, ſaid the other, but what with paying the Tythe, and

three ſeveral Loſſes, they are much abated; for at one Time I loſt half as many as I have now left, and another Time $\frac{1}{3}$ ſo many, and at the third Time $\frac{1}{4}$ ſo many; I demand how many he had left? *Anſwer* 864 Lambs.

57. Two Men, A and B, were diſcourſing of their Ages; ſays A to B ſeven Years ago, I was juſt 3 Times as old as you were, and 7 Years hence I ſhall be juſt twice as old as you will be, what are their preſent Ages?

*Anſwer* { A 49 Years old.
B 21 Years old.

58. An honeſt Country Farmer, being aſked the Number of his Cattle, anſwered thus, $\frac{1}{10}$ are Oxen, $\frac{1}{5}$ Cows, $\frac{1}{2}$ Sheep and $\frac{1}{8}$ Hogs, beſides 15 good Horſes, what were the Number of each?

*Anſwer* { 20 Oxen
40 Cows
100 Sheep
25 Hogs
15 Horſes

59. Being minded to purchaſe the Reverſion of a Leaſe of 500*l.* *per Annum*, for 18 Years to come, but doth not commence till the End of 3 Years, how much Money muſt be paid down, allowing 6 *per Cent.* Compound Intereſt? *Anſwer* 4624*l.* 11*s.* 4$\frac{3}{4}$*d.*

60. Three Merchants trading in Company, A gains 32*l.* in 7 Months, B 42*l.* in 9 Months, and C 54*l.* in 10 Months, with a Stock of 108*l.* 15*s.* I deſire to know A and B's Stock ſeparately?

*Anſwer* { A's Stock 45*l.* 2*s.* 2$\frac{1}{2}$*d.* $\frac{2}{3}$.
B's Stock 76*l.* 2*s.* 6*d.*

61. A Grocer agreed with a Carrier for 1 Ton and 3 Quarters of Goods 9 Miles wanting $\frac{3}{8}$, for $\frac{2}{3}$ of 36*s.* what muſt he pay *per* Hundred for 5 Miles and $\frac{3}{5}$ in the ſame Proportion? *Anſwer* 5$\frac{1}{4}$*d.* $\frac{1491}{4025}$.

62. Being employed to lay out 500*l.* at 3 $\frac{1}{2}$ *per Cent.* for a Friend, and by the 13th of *Auguſt*, 1760, it was raiſed by Intereſt to 674*l.* 17*s.* 6*d.* I deſire to know the Time the Bond beared Date? *Anſwer* the 10th of *Auguſt* 1750.

63. A Gentleman having a rectangular Park, in which he has a mind to Plant 1512 Oaks, 30 Foot aſunder in 18

Rows, I deſire to know the Length of this Park? *Anſwer* 840 Yards.

64. Two Merchants having a mind to purchaſe a Ship valued at 1400*l.* ſays A to B, if you will give me $\frac{4}{5}$ of your Money I can pay for the Ship alone; ſays B to A, if you give me $\frac{6}{7}$ of your Money, I can pay for it; how much Money had each?

*Anſwer* { A 675*l.* 17*s.* 2¾*d.* $\frac{17}{29}$.
{ B 724*l.* 2*s.* 9*d.* $\frac{12}{29}$.

1399*l.* 19*s.* 11¾*d.*

65. Suppoſe a Landlord lives far from his Tenant, yet judging his Tenant honeſt and able to pay him, is content to forbear his Rent 14 Years, upon Condition his Tenant will allow him 6 *per Cent.* compound Intereſt for the Forbearance; the Rent being 33*l.* *per Annum*; now the Queſtion is what muſt the Landlord receive at the End of 14 Years? *Anſwer* 693*l.* 10*s.*

66. What is a Leaſe of 25*l.* *per Annum*, to continue for 21 Years, worth in preſent Money, Diſcount or Rebate 6*l.* *per Cent.* compound Intereſt being allowed to the Purchaſer? *Anſwer* 294*l.* 9*s.* 11¼*d.*

67. There is a Leaſe of a Houſe or Land worth 12*l.* *per Annum*, and there are 16 Years of the Leaſe yet to come, which Leaſe a Man would buy if he could lay out his Money ſo as to gain 10*l.* *per Cent.* I deſire to know what the Leaſe is worth? *Anſwer* 129*l.* $\frac{3}{13}$.

68. There is an Annuity, or Yearly Rent or Income, of 200*l.* *per Annum*, forborn to the End of 6 Years; now how much is due at the End of the ſaid Time, allowing ſimple Intereſt at the Rate of 6 *per Cent*? *Anſwer* 1380*l.*

69. What preſent Money will ſatisfy a Debt of 240*l.* due at the End of 4 Years yet to come, Diſcount or Rebate being allowed at the Rate of 5*l.* *per Cent.* *per Annum*? *Anſwer* 200*l.*

70. A Boy lays out 2*s.* 6*d.* in Apples and Pears, the Apples he has 4 for a Penny, and his Pears 5 for a Penny; and afterwards accommodating his Neighbours with half his Apples, and one third of his Pears for 13*d.* which was the Price he bought them at, I deſire to know how many he bought of each Sort?

*Anſwer* { 72 the Number of Apples.
{ 60 the Number of Pears.

71. I deſire to know the Difference between the Rebate of 650*l.* for 9 Years, and the Intereſt of the ſame at 4 *per Cent.* *Anſwer* 61*l.* 18*s.* 10*d.*

72. A Farmer ordered his Servant to cultivate his Land, deſiring him to plough an Acre *per* Day; ſuppoſe the Land half a Mile long, and every Furrow it cut $7\frac{1}{2}$ Inches in Breadth, I deſire to know how many Miles the Plough muſt go to compleat the ſame? *Anſwer* 13 Miles, 1 Forlong, 24 Perches.

73. A merry young Gentleman had a Fortune left him by an old Aunt, $\frac{2}{9}$ of which he ſquandered away in 5 Months, $\frac{5}{7}$ of the Remainder held him 19 Months longer, by which Time he began to look into his Affairs, and found he had but 429*l.* left; I deſire to know how much his Aunt left him? *Anſwer* 1930*l.* 10*s.*

74. A Son aſked his Father how old he was; he anſwered thus, if you take $\frac{9}{11}$ of my Age, from $\frac{3}{7}$ of your Age, the Difference of our Ages would be 29; I deſire to know the Father's Age? *Anſwer* 74 Years, 5 Months and $\frac{1}{5}$.

75. I want to know the Length of a Cord, one End fixed to the Ground, that my Horſe may have the Liberty of eating an Acre of Graſs and no more? *Anſwer* 7,1366 Perches.

76. A Gentleman deſired to know the Value of 5 Books, whoſe Prices were fixed in the following Manner; the firſt four were together to make 7*l.* 10*s.* the four laſt 8*l.* 15*s.* the three laſt with the firſt 8*l.* 5*s.* the three firſt with the laſt 7*l.* 18*s.* the two laſt and two firſt 8*l.* 10*s.* I deſire to know the Price of each Book ſeparately.

| | | | | |
|---|---|---|---|---|
| *Anſwer* | 1ſt. Book | 1*l.* | 9*s.* | 6*d.* |
| | 2d. Book | 1*l.* | 19*s.* | 6*d.* |
| | 3d. Book | 1*l.* | 14*s.* | 6*d.* |
| | 4th. Book | 2*l.* | 6*s.* | 6*d.* |
| | 5th. Book | 2*l.* | 14*s.* | 6*d.* |

77. A Farmer agreed with three of his Neighbours for each a Horſe to draw a Load of Wheat, from *Buckingham* to *Wadford*, which are to be diſtinguiſhed by the three firſt Letters of the Alphabet; A and B are deemed to do $\frac{2}{5}$ of the Work, A and C $\frac{3}{7}$, and B and C $\frac{3}{9}$, their Agreement was 28*s.* for their Horſes, and to be paid proportionally to what Part each Horſe drawed, I deſire to know how much each Man had to receive?

*Anſwer* { 11*s.* 11$\frac{1}{4}$*d.*
7*s.* 4 *d.*
8*s.* 8$\frac{1}{2}$*d.* }

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27*s.* 11$\frac{3}{4}$*d.*

78. A Gentleman bequeathed to one of his Children $\frac{11}{19}$ of his Eſtate, and to the other $\frac{8}{19}$; but when it came to be divided, one received 209*l.* more than the other; I demand the Value of the whole Eſtate? *Anſwer* 1323*l.* 13*s.* 4*d.*

79. A General being minded to place 2400 Men in Battalia, ſo as there may be 60 in Rank and 40 in File, and they all to ſtand in Order, that is to ſay, 3 Foot diſtant in Rank and as much in File, how many ſquare Feet of Ground will they occupy, and what is the Side of that Square?

*Anſwer* { 20709 Square Feet they will Occupy
143,9 Square Feet Side of the Square }

80. A Man goes with a certain Number of Sheep to Market, where he ſold half of them and half a Sheep more; and thus he goes on to two other Markets, where he ſold half the Remainder and half a Sheep more, they being now reduced to 10, I deſire to know how many he had at firſt? *Anſwer* 87 Sheep.

81. A Gentleman lets out a certain Sum at 6*l. per Cent.* ſimple Intereſt, which Intereſt in 10 Years Time wanted but 12*l.* of the Principal, I demand the Principal? *Anſwer* 30*l.*

82. A Rope 9,69 Inches Circumference, I demand the Circumference of another Rope that is 11$\frac{1}{2}$ Times its Strength? *Anſwer* 32,86 Inches.

83. A Merchant ſells a certain Number of Oranges and Lemons for 137*l.* 10*s.* the Oranges were valued at 1*s. per* Dozen, and the Lemons at 2*s. per* Dozen; now ſuppoſe the Number of Lemons to be five Times the Number of Oranges how many Dozen of Oranges and Lemons were there in all?

*Anſwer* { 250 Dozen of Oranges
1250 Dozen of Lemons. }

84. If a Bullet of Braſs of 8 Inches Diameter weighs 72*lb.* what ſhall a Bullet of Braſs weigh whoſe Diameter is 4 Inches? *Anſwer* 9*lb.*

85. Three Men A, B and C, bought a Hhd. of Wine, which coſt them 40*l.* and they agreed to pay for it in the fol-

lowing Manner; that A ſhall pay $\frac{1}{2}$, B $\frac{1}{3}$, and C $\frac{1}{4}$, what Part of the ſaid 40*l.* muſt each Man pay, and what Quantity of Wine muſt each Man have in Proportion to what he paid?

| | | £. | s. | d. |
|---|---|---|---|---|
| *Anſwer* | A muſt pay | 18 | 9 | $2\frac{3}{4}\frac{1}{13}$ |
| | B muſt pay | 12 | 6 | $1\frac{3}{4}\frac{5}{13}$ |
| | C muſt pay | 9 | 4 | $7\frac{1}{4}\frac{7}{13}$ |
| | | £40 | 0 | 0 |

| | G. | Q. | P. |
|---|---|---|---|
| A muſt have | 29 | 0 | 0 $\frac{8}{13}$ |
| B muſt have | 19 | 1 | 1 $\frac{1}{13}$ |
| C muſt have | 14 | 2 | 0 $\frac{4}{13}$ |
| Hhd. | 1 | 0 | 0 |

86. Divide 540*l.* among three Men, give B 64*l.* more than A, and C 84 more than B, I deſire to know each Man's Part.

| | | £. | s. | d. |
|---|---|---|---|---|
| *Anſwer* | A | 109 | 6 | 8 |
| | B | 173 | 6 | 8 |
| | C | 257 | 6 | 8 |
| | | 540 | 0 | 0 |

87. If a Rope, whoſe Weight is 14*C* $\frac{3}{4}$, be 18 $\frac{3}{4}$ Inches Circumference; I demand the Weight of another Rope which is 9 $\frac{1}{4}$ Inches Circumference? *Anſwer* 5,9*C*.

88. A Gentleman had three Debtors whoſe Particular Sums he had forgot; but it appears that A and B together owed 24*l.* 12*s.* B and C together 29*l.* 15*s.* and A and C together 30*l.* 9*s.* I deſire to know the Particulars how much each Man is indebted?

| | | £. | s. | d. |
|---|---|---|---|---|
| *Anſwer* | A | 12 | 13 | 0 |
| | B | 11 | 19 | 0 |
| | C | 17 | 16 | 0 |

89. A Merchant bought 18 Pipes of *Madeira* Wine for 250*l.* and ſold them again for 320*l.* payable at the End of nine Months, Rebate being made at 5 *per Cent.* What was the neat Gain in ready Money? 67*l.* 9*s.* $4\frac{3}{4}$*d.*

90. A Gentleman having 13*l.* 15*s.* to Diſtribute in the Workhouſe among the Poor, to every Boy he gave 12*d.* to every Woman 18*d.* and to every Man 2*s.* there were for every Man 2 Women, and for every Woman 2 Boys, I demand the Number of each ?

*Anſwer*
25 Men
50 Women
150 Boys.

91. Twenty Perſons, conſiſting of Men, Women and Children, at a Collation payed 20*s.* the Men paying 4*s.* a Piece, the Women 6*d.* a Piece, and the Children 3*d.* a Piece, I deſire to know the Number of each Sort ?

*Anſwer*
3 Men
15 Women
2 Children

92. Suppoſe A has $\frac{2}{5}$ of a Wood, B $\frac{2}{7}$ and C the Remainder; and A and B buy C's Part equally between them; I demand what Part of the Wood A muſt have; and what Part B will have after they have bought C's Part, alſo how much Money C muſt have, the whole Wood being valued at $\frac{5}{8}$ of 999*l.* $\frac{5}{6}$.

*Anſwer*
A's Part of the Wood $\frac{39}{70}$
B's Part of the Wood $\frac{31}{70}$
C muſt have 196*l.* 7*s.* 11*d.*

93. If $\frac{1}{4}$*lb.* of Gunpowder be ſufficient to charge a Gun whoſe concave Diameter is 1 $\frac{1}{2}$ Inch, how much Gunpowder will ſuffice to charge a Gun whoſe concave Diameter is 7 Inches ? *Anſwer* 76,2*lb.*

94. A Draper bought 7 Packs of Cloth, every Pack had 5 Parcels in it, and each Parcel 9 Pieces, and every Piece 27 Yards, he gave after the Rate of 3*l.* 12*s.* for every 5 Yards, I demand the Price of the 7 Packs, and what the Cloth coſt *per* Yard.

*Anſwer*
7 Packs coſt 6123*l.* 12*s.*
One Yard coſt 14*s.* 4$\frac{3}{4}$*d.*

95. A Farmer going to Market with Sheep, Weathers, Ewes and Lambs, for which he received 110*l.* he ſold his Weathers as 8*s.* a piece, his Ewes at 6*s.* his Lambs at 4*s.* a piece; for every Weather he had 2 Ewes, and for every Ewe he had 3 Lambs; I deſire to know how many he had of each Sort ?

*Anſwer*
50 Weathers
100 Ewes
300 Lambs

96. A Gentleman bequeathed 100*l* to the Pariſh towards the Relief of the poor Children, to 20 Girls 2*s.* 4*d. per* Week each, and 30 Boys at $3\frac{1}{2}$*d. per* Day each, I deſire to know how long this Sum will maintain them? *Anſwer* 18 Weeks and 3 Days.

97. Admit the Cathedral Church of St. Paul's to have 10 Canons and 20 Vicars, and their Expences Yearly to be 3000*l.* Suppoſe every Canon to have 4 Times as much as a Vicar, how much is each Man's yearly Income?

*Anſwer* { Every Canon 200*l.* each.
Every Vicar 50*l.* each.

98. By my Accounts from *Madrid* my Factor has acquainted me he has diſpoſed of my Goods in the following Manner, *viz.* 150 Pieces of Iriſh Cloth each 26 Yards at 8 Livres *per* Yard, 150 Dozen Pair of Shoes at 8 Livres *per* Pair, 49*C.* 1*qr.* 17*lb.* of Cheeſe at 15 Sols *per lb.* the Charges upon the ſaid Goods amounting to 150*l.* Sterling, I order my Factor to make my Returns as follows, $\frac{1}{3}$ in Wine at 34*l. per* Pipe, $\frac{2}{5}$ in Allum at 1*l.* 12*s.* $9\frac{1}{2}$*d. per Cwt.* the reſt in Pieces of $\frac{8}{8}$, Exchange at 4*s.* 8*d.* what Number and Quantity am I to receive of each, allowing my Factor $2\frac{3}{4}$ *per Cent.* on the Return of the ſaid Goods?

*Anſwer* { In Wine 15,4995 Pipes
In Allum 385,715 Cwt.
Pieces of $\frac{8}{8}$ 1807,056

99. Two Men bought a Quantity of Malt for 96*l.* which was agreed to be paid in this Proportion, that is three Times, one Part may be equal to four Times the other, I deſire to know how much each Man paid?

*Anſwer* { The firſt paid 41*l.* 2*s.* $10\frac{1}{4}$*d.*
The ſecond paid 54*l.* 17*s.* $1\frac{3}{4}$*d.*

96*l.* 0*s.* 0*d.*

100. A Perſon making his Will bequeathed his Eſtate in the following Manner. Imprimis, he gave to his eldeſt Son $\frac{2}{5}$ of $\frac{3}{7}$, and $\frac{2}{13}$ of his Eſtate, to his eldeſt Daughter he gave $\frac{1}{3}$ of $\frac{2}{5}$ and $\frac{1}{9}$ of his Eſtate; when the eldeſt Son and Daughter's Fortunes came to be paid, the Son received 109*l.* more than the Daughter; I deſire to know what was the whole Eſtate, and what Part was left for his Wife and younger Children?

| | | |
|---|---|---|
| *Anſwer* | The whole Eſtate | 1348*l.* 10*s.* 1*d.* |
| | The eldeſt Son | 438*l.* 12*s.* 8$\frac{1}{4}$*d.* |
| | The eldeſt Daughter | 329*l.* 12*s.* 8$\frac{1}{4}$*d.* |
| | The Wife, younger Children | 580*l.* 4*s.* 8$\frac{1}{2}$*d.* |
| | | 1348*l.* 10*s.* 1*d.* |

101. A Gentleman aſked his Companion what Hour of the Day it was, who anſwered the Days at this Time are 13 Hours long, now if $\frac{2}{3}$ of the Hours paſt be added to $\frac{3}{4}$ of the Remainder, reckoning from Sun riſing, you will have the Hour deſired; what was the Hour? *Anſwer* 9 Hours paſt, and 4 to come.

102. If a Ship of 100 Tons be 44 Feet long at the Keel, of what Length ſhall the Keel of a Ship be of 220 Tons? *Anſwer* 57,225 Feet.

103. A young Student had been to look upon a Clock, and being aſked what o'Clock it was, anſwered, between 5 and 6; but a more particular Anſwer being aſked, he ſaid, at that very Moment the Minute Hand and the Hour Hand were together, what was the Time of the Day? *Anſwer* 27 Minutes and 16 Seconds after 5.

104. A Wine Merchant bought as many Caſks of Wine as coſt him 600*l.* and ſold them out again at 31*l.* 10*s.* *per* Caſk, and gained as much Money by them as one Caſk coſt him, I demand what he gave for each Caſk? *Anſwer* 1*l.* 10*s.*

105. A Farmer ſold 7*qrs.* of Barley for 5*l.* 15*s.* by which he gained 20 *per Cent.* what was his Gain *per Cent.* by ſelling the ſame Quantity at 7*l.* 5*s*? *Anſwer* 31*l.* 6*s.* 1*d.* $\frac{1}{23}$.

106. My Factor at *Liſbon* adviſed me he had diſpoſed of my Goods in the following Manner, *viz.* 140 Quarters of Wheat at 6 Milreas *per* Quarter, 120 Yards of broad Cloth at 3 Milreas *per* Yard, 40*C.* 2*qrs.* 9*lb.* of *Corniſh* Tin, at 250 Reas *per lb.* Charges on the ſame Goods amounted to 119*l.* 10*s.* I order my Factor to make me Returns as follow, $\frac{3}{5}$ of the Value in Wine at 15*l.* *per* Hhd. $\frac{1}{7}$ of it in Fruit at 30*s.* *per* Cheſt, and the reſt in Milreas; what Number and Quantity am I to receive after my ſaid Factor is allowed for his Commiſſion 1$\frac{3}{4}$ *per Cent.* on the ſaid Returns?

*Anſwer*
In Wine 25,9085 Hhds.
In Fruit 61,6869 Cheſts.
In Milreas 499,6645.

107. I Bought a Puncheon of Rum for 38*l.* 10*s.* to which I was minded to put as much Water as will reduce the Prime Coſt to 7*s.* 4*d.* *per* Gallon; the Queſtion is, what Quantity of Water muſt that be? *Anſwer* 21 Gallons.

108. Laid out in a Lot of Muſlin 1440*l.* 12*s.* but upon overlooking the ſame, $\frac{2}{7}$ of it was damaged, ſo that I was obliged to ſell it at 7*s.* *per* Yard, and by ſo doing I loſt 171*l.* 10*s.* how much *per* Ell muſt I ſell the Remainder for to make up the ſaid Loſs? *Anſwer* 17*s.* 6*d.* *per* Yard.

109. A Factor exchanged 5 *French* Crowns and 4 Dollars, for 46*s.* *Engliſh* Money; alſo at another Time he exchanged 7 *French* Crowns, and 6 Dollars, each of theſe being the ſame Value with the former, for 66; I demand the Value of a French Crown, and alſo of a Dollar in *Engliſh* Money?

*Anſwer*
6*s.* 0*d.* a *French* Crown.
4*s.* 0*d.* a Dollar.

110. Admit a Ship of 500 Tons be 75 Feet by the Keel, 34 Feet in Breadth at the Beam, and 30 Feet deep in the Hold, I demand the Length at the Keel, the Breadth at the Beam, and Depth in the Hold of another Ship that is to be 784 Tons?

*Anſwer*
The Length at the Keel 87,1 Feet.
The Breadth at the Beam 39,4 Feet.
The Depth in the Hold 34,8 Feet.

111. A Ship being 132 Feet 9 Inches in the Hold, 42 Feet broad, and 7 Feet 8 Inches deep, I demand how many Bales of Goods may be ſtowed therein, each 4 Feet 4 Inches long, and 3 Feet 3 Inches broad, and 3 Feet 6 Inches deep, leaving 3 Feet 10 Inches for a Gangway the whole Length? *Anſwer* 788 $\frac{55}{1183}$ Bales.

# BILLS OF PARCELS.

## *Mrs.* JOHNSON.

*Nov.* 17, 1760, Bought of *Iſabella Tradeſair* and Co.

| | | | | |
|---|---|---|---|---|
| 17 | Pair of Stockings at | 5*s.* | 5*d.* | *per* Pair. |
| 25 | Silk Handkerchiefs at | 4*s.* | 9*d.* | each. |
| 23 | Pair of Thread Stockings at | 4*s.* | 3*d.* | *per* Pair. |
| 16 | Pair of Strawberry Hoſe at | 3*s.* | 10*d.* | |
| 22 | Pair of *Norwich* Hoſe at | 5*s.* | 2*d.* | |
| 15 | Pair of Silk Gloves at | 5*s.* | 3*d.* | |
| | Total 28*l.* | 2*s.* | 4*d.* | |

Received *December* 27, 1760. the Contents in full, for Self and Company,

*per Jonathan Tradeſair.*

## *Madam* ROBINSON,

Bought of *Robert Shuter, October* 15, 1760.

| | | | | |
|---|---|---|---|---|
| 23 | Ells of Dowlas at | 1*s.* | 5*d.* | *per* Ell. |
| 15 | Ells of Holland at | 3*s.* | 9½*d.* | |
| 22 | Ells of Diaper at | 1*s.* | 3*d.* | |
| 18 | Damaſk Napkins at | 2*s.* | 9*d.* | each. |
| 17 | Yards of Damaſk at | 4*s.* | 6*d.* | *per* Yard. |
| 15 | Yards of Muſlin at | 6*s.* | 9*d.* | |
| | Total 17*l.* | 4*s.* | 2½*d.* | |

## *Madam* WAITE,

Bought of *Moſes Chinaman, Aug.* 5, 1760.

| | | £. | *s.* | *d.* | |
|---|---|---|---|---|---|
| 5 | Dozen of Glaſſes at | 0 | 0 | 7½ | each. |
| 24 | China Diſhes at | 0 | 9 | 8 | |
| 3 | Dozen of Enamelled Plates at | 0 | 3 | 3 | |
| 4 | Dozen of China Plates at | 0 | 2 | 3 | |
| 5 | Pair of large Jarrs at | 0 | 3 | 4 | |
| A | compleat Tea Table Set | 2 | 19 | 0 | |
| | Total | 28 | 10 | 2 | |

*The Reverend Mr.* HARROW,
Bought of *Adam Stockholm*, *June*, 11, 1760.

| | | | | |
|---|---|---|---|---|
| 3 Fine Turbot at | 0*l.* | 7*s.* | 6*d.* | each. |
| 107 Dried Salmon at | 0 | 1 | 3¼ | |
| Sturgeon, 5 Kegs, at | 0 | 14 | 9 | |
| 2¼ Hundred of Ling at | 7 | 8 | 9 | *per* Hund. |
| Herrings, 7 Barrels, at | 4 | 7 | 10 | each. |
| 3½ Hundred of Stockfiſh at | 3 | 17 | 3 | *per* Hund. |
| Total | 72 | 12 | 1½ | |

*The Honourable Lady* GOODISON,
Bought of *William Henley*, *October* 20, 1760.

| | *s.* | *d.* | |
|---|---|---|---|
| 2 Hundred Golden Pippins at | 2 | 9 | *per* Hund. |
| 2¾ Hundred of Windſor Pears at | 2 | 7 | |
| 12 Ropes of Onions at | 1 | 3½ | each. |
| 9 Dozen of Lemons at | 2 | 9 | *per* Doz. |
| 12½ Dozen of *Liſbon* Ditto at | 1 | 3 | |
| 25 Dozen of Seville and China Oranges | 3 | 11½ | |
| Total 8*l.* | 7 | 5¼ | |

*Sir* GEORGE NEWHAM, *Bart.*
Bought of *James Finchley*, *Aug.* 5, 1760.

| | | | |
|---|---|---|---|
| 20 Ells of Muſlin at | 9*s.* | 2*d.* | *per* Ell |
| 19 Yards of Long Lawn at | 5 | 0 | *per* Yd. |
| 17 Yards of *Iriſh* Cloth at | 1 | 9 | |
| 18 Yards of Flowered Cotton at | 4 | 6 | |
| 20 Yards of Bag Holland at | 5 | 6 | |
| 30 Yards of Dowlaſs at | 1 | 6 | |
| Total 27*l.* | 4 | 1 | |

*The Right Hon. the Counteſs of* OXFORD,
Bought of *John Mercer*, *December* 5, 1760.

| | | | |
|---|---|---|---|
| 14½ Yards of flower'd Silk at | 15 | 9 | *per* Yd. |
| 18 Yards of Silk Poplin at | 12 | 7 | |
| 13½ Yards of Satin at | 8 | 10 | |
| 17¼ Yards of *Genoa* Velvet at | 16 | 5 | |
| 19½ Yards of *Mancheſter* Ditto at | 15 | 5 | |
| 15 Yards of Luſtring at | 5 | 7 | |
| Total 62*l.* | 1*s.* | 8¼*d.* | |

*Mr.*

### *Mr.* EBENEZER SHEPHERD,

Bought of *Aaron Leather, July* 5, 1760.

| | | | |
|---|---|---|---|
| Oil'd Bucks Skins 24 at | 13*s.* | 5*d.* | each. |
| Oil'd Ram Skins 152 at | 3 | 9 | |
| Oil'd Lamb Skins 290 at | 1 | 2½ | |
| Sheep Skins dreſſed in Allum 180 at | 1 | 1¼ | |
| Goat Skins 98 at | 0 | 10¾ | |
| Calves Skins 23 at | 3 | 9½ | |

Total 80*l.* 16*s.* 2*d.*

### *Mr.* TITUS WILKINSON,

Bought of *Timothy Oilman, February* 23, 1760.

| | | | |
|---|---|---|---|
| A fine *Weſtphalia* Ham Wt. 25*lb.* at | 0*s.* | 9½ | *per lb.* |
| 3½ Gallons of Pickled Muſhrooms at | 2 | 11 | *per Qt.* |
| 30½ Pound of Bay Salt at | 0 | 5½ | *per lb.* |
| 39¾ Pound of Capers at | 1 | 1¾ | |
| 19½ Pound of Anchovies at | 0 | 11¾ | |
| 20½ Pound of Salt Petre at | 0 | 10¾ | |

Total 7*l.* 17 6¾

### *The Right Hon. Lord* CHESTER,

Bought of *Samuel Fareham, March* 6, 1760.

| | | | |
|---|---|---|---|
| Half a Cwt. of Sugar at | 0*s.* | 6*d.* | *per lb.* |
| 6 Sugar Loaves, Wt. 44¾*lb.* at | 1 | 1 | |
| 3 Pound of Cloves at | 7 | 2 | |
| 1 Barrel of Figs, Wt. 1 Cwt. and 17 *lb.* at | 0 | 6 | |
| 3 Frails of *Malaga* Raiſins, wt. 70*lb.* at | 0 | 4¾ | |
| Quarter of a Butt of Currants, wt. 2*C.* 1*qr.* 17*lb.* | 0 | 3¾ | |

Total 13*l.* 14 3

### *Mr.* CHARLES GAINSAY,

Bought of *Michael Draper, Aug.* 1, 1760.

| | | | |
|---|---|---|---|
| 18 Yards of Broad Cloth at | 17*s.* | 6*d.* | *per* Yd. |
| 17 Yards of *Yorkſhire* Cloth at | 7 | 9 | |
| 12½ Yards of Black Cloth at | 15 | 8½ | |
| 28½ Yards of Shalloon at | 1 | 9 | |
| 20¾ Yards of Serge at | 5 | 10 | |
| 15½ Yards of Superfine Scarlet at | 18 | 6 | |

Total 55*l.* 0*s.* 9¼

*Mr.* ***SAUL HEARTY,*** *and* Partner,
Bought of *David Shadwell* and *Co.*

| | | | |
|---|---|---|---|
| 14 Barrels of Raiſins, wt, 23*C.* 1*qr.* 17*lb.* at | 1*l.* | 19*s.* | 6*d. per C.* |
| 2 Bags of black Pepper, wt. 3*C.* 3*qrs.* 7*lb.* at | 1 | 17 | 4 |
| 5 Hhds of Sugar wt. 74*C.* 2*qrs.* 26*lb.* at | 2 | 2 | 0 |
| 6 Cakes of Bees Wax, wt. 12*C.* 1*qr.* 13*lb.* | 3 | 1 | 2 |
| 2 Butts of Currants, wt. 49*C.* 2*qrs.* 15*lb.* | 1 | 15 | 4 |
| 14*lb.* of Cloves, at ——— | 0 | 1 | 2 *per Oz.* |
| 15 Barrels of Figs, wt. 33*C.* 1*qr.* 3*lb.* at | 2 | 7 | 6 *per C.* |
| Total | 427*l.* | 17*s.* | 6*d.* |

*Mr.* ***NATHANIEL BRONSTON,***
Bought of *Henry Beater, Jan.* 20, 1760.

| | | | |
|---|---|---|---|
| A Copper Weight 89*lb.* at ——— | | 1*s.* | $2\frac{1}{2}$*d. per lb.* |
| Ironwork to Ditto. wt. 43*lb.* at — | | 0 | $2\frac{1}{2}$ |
| A Fireſhovel, Tongs, Poker, wt. 23*lb.* at | | 0 | $4\frac{3}{4}$ |
| A Stove Grate, wt. 39*lb.* $\frac{1}{2}$. at | | 0 | $3\frac{1}{4}$ |
| 3 Braſs Saucepans, wt. 31*lb.* at — | | 1 | $5\frac{1}{4}$ |
| A large Iron Pot and a ſmall one wt. 49*lb.* at | | 1 | $3\frac{3}{4}$ |
| Total | 12*l.* | 5*s.* | 2*d.* |

*Mr.* ***STEPHEN GOODMAN,***
Bought of *Iſaac Moreton, November* 15, 1760.

| | | | |
|---|---|---|---|
| 8 Score of *Hertfordſhire* Eggs at | 0*l.* | 0*s* | $0\frac{3}{4}$*d.* each. |
| 5 Flitches of Bacon, wt. 2*C.* 1*qr.* 12*lb.* at | 1 | 0 | 9 *per Cwt.* |
| 9 Pots of Hogs Lard, wt. 1*C.* 0*q.* 19*lb.* at | 0 | 0 | $2\frac{1}{2}$ *per lb.* |
| Suffolk Butter 5 Weys at — | 8 | 4 | 2 each. |
| *Glouceſterſh.* Cheeſes 15, wt. 7*C.* 1*qr.* 3*lb.* | 1 | 19 | 6 *per C.* |
| *Warwickſh.* do. 71, wt. 9*C.* 3*qrs.* 21*lb.* | 1 | 3 | 1 |
| Total | 71*l.* | 3*s.* | $9\frac{3}{4}$*d.* |

*Mr.* ***JOSEPH BAGSHAW,***
Bought of *Jacob Merchant, May* 15, 1760.

| | | | |
|---|---|---|---|
| Tobacco 7 Hhds. wt. 28*C.* 2*qrs.* 17*lb* at | 4*l.* | 17*s.* | 9*d. per C.* |
| Figs 9 Barrels, wt. 7*C.* 1*qr.* 19*lb.* at | 1 | 7 | 5 |
| Currants 4 Butts, wt. 74*C.* 0*q.* 13*lb.* at | 2 | 1 | 7 |
| Sugar 7 Hhds. wt. 55*C.* 0*q.* 7*lb.* at | 1 | 17 | 9 |
| Raiſins 15 Barrels, wt. 65*C.* 2*qs.* 27*lb.* at | 1 | 19 | 4 |
| Ginger 3 Hhds. wt. 2*C.* 1*q.* 9*lb.* at | 3 | 7 | 2 |
| Total | 545 | 6 | $11\frac{1}{4}$ |

### *The Hon. Mrs.* DRINKWATER,

Bought of *Catherine Hoſier, May* 1, 1760.

| | | |
|---|---|---|
| 5½ Dozen of Cotton Muffatees at | 0*s.* | 4½*d. per* Pair |
| 19½ Yards of black Ribband at — | 0 | 5¼ *per* Yard |
| 2½ Dozen of Kid Gloves at — | 1 | 11 *per* Pair |
| 52 Pair of Thread at —— | 4 | 5 |
| 35 Yards of Ferret at —— | 0 | 2½ *per* Yard. |

Total 16*l.* 7*s.* 8¾*d.*

### *Mr.* FREDERICK HALL,

Bought of *Richard Stationer, Aug.* 5, 1760.

| | | |
|---|---|---|
| 2 Quires of the beſt marble Paper at | 0*s.* | 1½*d. per Sht.* |
| 43 Sticks of the beſt Sealing Wax at | 0 | 4¾ *per Stick* |
| 132 Quires of Tea Crown Paper at | 0 | 4 *per Quire* |
| 2 Reams of *French* Demy at | 2 | 4 |
| 4 Reams of *French* Royal at | 1 | 6 |
| 3 Dozen of Memorandum Books at | 0 | 2 each. |

Total 14*l.* 6 4¼

### *Meſſ.* GRANT *and* HARLEY,

Bought of *Luke Turner* and Partner, *September* 16 1760.

| | | |
|---|---|---|
| A Tod of carded Wool, wt. 28*lb.* at | 2*s.* | 8*d. per lb.* |
| A Sack of Wool, wt. 364*lb.* at | 1 | 11 |
| 131 Pound of black Wool at — | 3 | 1¼ |
| 1 Dozen of Pound Maps at — | 0 | 9 each |
| 1½ Dozen of long Hair Brooms at | 0 | 10½ |
| 34¼ Foot of Matting at — — | 1 | 0½ *per* Yd. |

Total 61*l.* 19*s.* 4¾*d.*

### *Meſſ.* JONES *and* CARTER,

Bought of *Croſs* and *Gilbert*, Partners. *May* 3, 1760.

| | | |
|---|---|---|
| 5 Bags of *Spaniſh* Tobacco, Nt. 593*lb.* ¾ at | 0*s* | 5¼*d. per lb.* |
| 1 Box of *Virginia* do. Nt. 1*C.* 3*qrs.* 23*lb.* at | 1 | 3¾ |
| 1 Hhd. *Oroonoko* do. Nt. 3*C.* 1*q.* 18*lb.* at | 1 | 5 |
| 1 Box Turpentine Chips, Nt. 53½*lb.* at | 0 | 2½ |
| 1 Lot of *Scotch* Snuff, Nt. 4*C.* 1*q.* 15*lb.* at | 0 | 11¼ |
| ½ Lot *Havanah* do. Nt. 3*C.* 3*qrs.* 17*lb.* at | 1 | 7½ |
| 1 Lot of *Straſburgh* Nt. 2*C.* 1*q.* 15*lb.* at | 1 | 2¼ |

Total 129*l.* 7*s.* 0*d.*

# BILLS ON BOOK DEBTS.

*The Honourable Mrs.* C A S T O R,
Dr. To *Joſiah Gilroy*, 1760.

| | | | | |
|---|---|---|---|---|
| *July* 31. | A Mahogany Cheſt of Drawers compleat | 18*l* | 11*s* | 6*d* |
| *Aug.* 2. | 1 Dozen of Mahogany Chairs at | | 6 | 10 each |
| 15. | A Featherbed and Bolſter | 3 | 0 | 0 |
| 23. | 4 Pair of Blankets at | 0 | 18 | 0 each |
| 29. | 4 Quilted Coverlids at | 1 | 9 | 0 each |
| | Total | 35 | 1 | 6 |

If a Servant receives the Bill, let the Receipt run thus; *Received* September 25, 1760, *the Contents in full, for my Maſter* Joſiah Gilroy.

35*l* 1*s* 6*d*

*per* Abraham Whitehead.

*Her Grace the Dutcheſs of* Argyle, *Dr.*
To *Ferdinando Ranger*, 1760.

| | | | | | |
|---|---|---|---|---|---|
| *Jan.* 15. | 73 Gallons of Claret Wine at | 1*l.* | 1*s.* | 8*d.* | *per G.* |
| 27. | 43 do. of Mountain at | 0 | 6 | 7 | |
| *Feb.* 5. | 57 do. of Port red at | 0 | 7 | 10 | |
| | 12 do. of Burgundy at | 1 | 16 | 0 | |
| | 19 do of Champaign at | 1 | 7 | 0 | |
| | 27 do. of Madeira at | 0 | 7 | 2 | |
| | 29 do. of White Liſbon at | 0 | 6 | 5 | |
| | Total | 181 | 15 | 10 | |

*The Right Hon.* PERCY *Earl of* Northumberland, *Dr.*
To *Peter Arundell* and Partner, 1760.

| | | | | |
|---|---|---|---|---|
| *Aug.* 10. | To a new Poſt Chariot | 71*l.* | 11*s.* | 6*d.* |
| 13. | To 20 Yds. of Green Cloth for the Lining at | | 1 | 2 *per Yd.* |
| 28. | To 300 fine Braſs Nails at | | 4 | 6 *per Hd.* |
| | To 15 Yds. of brown Serge for the Box — — | | 8 | 6 *per Yd.* |
| 30. | To 31 Yds. Laced Ferret at | | 0 | 6¼ |
| | To 1 Pair of Harneſs compleat | 12 | 0 | 0 |
| | Total | 92 | 11 | 11¾ |

## *Sir* NICHOLAS BACON, *Dr.*

To *George Manwell*, for Work and Materials at his Houſe at *Mary-le-bone*, 1760.

| | | | | |
|---|---|---|---|---|
| *July* 17. | 30 Hundred of Lime at | 17*s*. | 3*d*. | *per Hundred* |
| 27. | 40 Thouſand of Bricks at 1*l*. | 0 | 0 | *per Thouſand* |
| 29. | Work for 13 Men 17 Days, at | 3 | 6 | *per Day* each. |
| *Aug*. 4. | Do. for 13 Labourers Do. at | 2 | 1 | |
| 15. | 11 Thouſand 10 Inch Tiles at | 0 | 3½ | each |
| 26. | 20 Load of Sand at | 2 | 6¾ | *per Load.* |

Total 290 11 0

## CHRISTOPHER HENSEY, Eſq; *Dr.*

To *Abraham Cronſey*, 1760.

| | | | | | |
|---|---|---|---|---|---|
| *Dec*. 6. | Oats 10 Quarters at | — | 1*s*. | 10*d* | *per Buſhel* |
| 12. | Barley 15 Qrs. at | — | 2 | 8 | |
| 14. | Beans 12 Qrs. at | — | 3 | 9 | |
| 18. | Peas 9 Qrs. at | —— — | 3 | 5 | |
| 20. | Hops 28 Pounds at | — | 3 | 10 | *per lb.* |
| 30. | Malt 10 Qrs. at | —— | 1 | 3 | *per Buſhel* |

Total £ 64 0 0

## *Mr.* PAUL DANDRIDGE, *Dr.*

To *Jonathan Carpenter* and Partner, 1760.

| | | | | | |
|---|---|---|---|---|---|
| *Sept*. 4. | 21 Feet of Fir Timber at | | 0*s*. | 3½*d* | *per Foot* |
| 11. | 13 Whole Deals at | — | 1 | 9 | *each* |
| 17. | 15 Slit Deals at | —— | 0 | 10½ | |
| 19. | 26 Hundred of Nails at | — | 0 | 6 | *per Hund.* |
| *Oct*. 2. | 17 Hundred of Nails at | — | 0 | 10 | |
| 15. | 26 Days Work at | —— | 2 | 6 | *per Day.* |

Total £ 6 14 1

## *Mr.* BENJAMIN DAVIES, *Dr.*

To *Simon Matthewſon*, Dyer, 1760.

For Dying the following Goods, delivered as *per* Order, to *Giles Penn*, Packer.

| | | | | | |
|---|---|---|---|---|---|
| *May* 12. | Yellow Stuffs 50 Pieces at | | 13*s*. | 9*d*. | *per Piece* |
| *Aug*. 6. | Blue do. 80 do. at | —— | 12 | 3 | |
| *Nov*. 23. | Black do. 20 do. at | — | 11 | 9 | |
| 29. | White do. 70 do. at | — | 8 | 10 | |
| *Dec*. 24. | Orange do. 40 do. at | —— | 14 | 7 | |
| 30. | Green do. 29 do. at | —— | 8 | 8 | |

Total £ 167 15 6

*The Right Hon. the Marquis of* Caralas, *Dr.*
To *Philip Harrington,* 1760.

| | | | | | | |
|---|---|---|---|---|---|---|
| *April* | 6. | A dozen fine matted Chairs at | 0*l.* | 17*s.* | 9*d.* | each |
| | 17. | A Pair of India Cabinets | 33 | 19 | 6 | |
| | 28. | Two Chimney Glaſſes at | 2 | 15 | 9 | each |
| *May* | 17. | Four Sconces at —— | 0 | 4 | 10 | |
| | 29. | Two pair of Glaſſes at | 5 | 7 | 6 | *per* Pair |
| | 31. | Three Pair of Chineſe Curtains at | 3 | 15 | 3 | |
| | | Total | £73 | 4 | 1 | |

*The Hon. Mr.* SHAKESPEAR, *Dr.*
To *Andrew Stoneland,* 1760.

| | | | | | |
|---|---|---|---|---|---|
| *May* | 10. | 120 Feet of Pavement, Purbeck St. at | 0*s.* | 7*d.* | *per F.* |
| *June* | 5. | 3 Pieces of Curb, each 5 Feet at | 1 | 6 | |
| | 12. | Marble Chimney Ps. 7 Ft. by 2 Ft 4 Is. at | 5 | 0 | |
| | 15. | One Portland Slab 6 Ft. by 3 Ft. 6 Is. at | 1 | 7 | |
| | 29. | The Pavement of a Yard with Purbeck Stone 24 Ft. 5 Is. by 17 Ft. 6 Is. } at | 2 | 9 | |
| | | Total £ 69 | 2 | 5 | |

*His Grace the Duke of* Hamilton, *Dr.*
*To* HUGH HOPKINSON, 1760.

| | | | |
|---|---|---|---|
| *Aug.* | 10. | To 14 Stone and a half of Beef at | 5½*d. per lb.* |
| | 11. | A Leg of Mutton wt. 15*lb.* at —— | 5 |
| | 12. | A Quarter of Lamb, wt. 17*lb.* at — | 6¼ |
| | | 5*lb.* and a half of Sewit at —— | 6 |
| | 28. | 2 Shoulders of Veal, wt. 32 *lb.* at | 6½ |
| | 30. | 3 Fillets of do. wt. 4 Stone at | 6¼ |
| | 31. | 2 Breaſts of Mutton, wt. 18*lb.* at | 3¾ |
| | | Total | £5 10 7¾ |

*Mr* ISRAEL BOSWORTH, *Dr.*
To *Oliver Lovemoney* and *Co.* 1760.

| | | | | | | |
|---|---|---|---|---|---|---|
| *Jan.* | 5. | To a Bill of 242 Guilders at | 6 Guilders *per French* Cr. | | | |
| *Mar.* | 12. | 492 Livres at | 3 Livres *per French* Cr. | | | |
| | 19. | To 15 Pipes of Port Wine at | 14*l.* | 9*s.* | 9*d.* | *per* Pipe |
| *April* | 15. | To 7 Pipes of Rheniſh at | 13 | 11 | 7 | |
| | 18. | To 14 Pipes of White at | 19 | 15 | 6 | |
| | | Total | £ 635 | 3 | 0 | |

*Note,* 4*s.* 6*d.* makes one *French* Crown.

### *Mr.* L A B A N  K I B R O T H, *Dr.*

*To Dauiel Garmite* 1760.

| | | | | |
|---|---|---|---|---|
| *Oc.* 15. | Braſs Door Locks 12 at | | 7*s.* | 11*d.* each |
| 17. | Bolts wt. 1*C.* 1*qr.* 19*lb.* at | | 0 | 3¼ *per lb.* |
| 19. | Spring Door Locks 17 at | | 3 | 9 each |
| 22. | A large Iron Stove wt. 1*C.* 2*qr.* 15*lb.* at | | 13 | 9 *per Cwt.* |
| 28. | An Iron Back——1*C.* 1*qr.* 11*lb.* at | | 11 | 9½ |
| 31. | Hinges 52 Pair 2*C.* 1*qr.* 15*lb* at | 1*l.* | 7 | 3½ |
| | Total £ | 15 | 5 | 2¼ |

### *The Honourable Madam* Rowe, *Dr.*

*To Meſſrs. Corbet and Barraſs,* 1760.

| | | | | |
|---|---|---|---|---|
| *Sep.* 12. | 10 Dozn. *lb.* of long Sixes at — | | | 7½*d. per lb.* |
| 19. | 14 Dozen of Tens at —— | | | 7¼ |
| *Oct.* 5. | 9 Dozen of ſhort Sixes at —— | | | 7¾ |
| 12. | 6 Dozen of mould Candles at | | 12*s.* | 4 *per Doz.* |
| 19. | 8 Dozen Ruſh Lights at | | 6 | 3 |
| 23. | Hard Soap wt. 3*C.* 1*qr.* 15*lb.* at | | 0 | 6¾ *per lb.* |
| | Total £ | 29 | 3 | 5¼ |

### *Mr.* J O S H U A  A S H T O N *and Partner, Dr.*

*To Auguſtus Kingſtone,* 1760.

| | | | | |
|---|---|---|---|---|
| *May* 7. | 9 Barrels of Figs wt. 7*C* 3*qr.* 17*lb.* at | 1*l.* | 7*s* | 3*d. p. Cwt.* |
| 15. | 5 Hog. of Sugar 47*C.* 1*qr.* 11*lb.* at | 1 | 15 | 7 |
| 20. | 4½ Butts of Currants 79*C.* 0*q.* 6*lb.* at | 1 | 18 | 4 |
| *June* 5. | 12 Barrels of Raiſins 52*C.* 0*q.* 9*lb.* at | 1 | 13 | 9 |
| 19. | 7 Barrels of Ginger 42*C.* 0*q.* 11*lb.* at | 1 | 19 | 7 |
| 30. | 7 Hhd. of Tobacco 22*C.* 1*q.* 12*lb.* at | 4 | 18 | 0 |
| | Total £ | 527 | 4 | 11¾ |

### *Mr.* M A R K  O R L A N D, *Dr.*

*To William Twiſt, Silkman,* 1760.

| | | | | |
|---|---|---|---|---|
| *May* 14. | To Smyrna Silk 112*lb.* at — | | 0*s.* | 11¼*d. per Oz.* |
| 28. | To Morea ditto 59 great Pounds at | | 1 | 8½ |
| *June* 5. | To Raw ditto 292*lb.* at —— | | 0 | 9¾ |
| 15. | To Bellandine ditto 259*lb.* at | | 0 | 11¾ |
| 25. | To China do. 13¾ great Pounds at | | 3 | 1 *per Oz.* |
| 30. | To Twiſted Silk 18½*lb.* at —— | | 2 | 10¼ |
| | Total £ | 690 | 15 | 0 |

Invoice

# Invoice from FRANCE.

*Dunkirk, May* 15, 1760.

Invoice of 5 Hhds. of Claret and 9 Ps. of Prunes, ſhipped on board the Unicorn, *Thomas Duprice*, Maſter, of the Account and Riſque of *Timothy Kingtsone*, Merchant in *London*, Marked as in the Margin.

To 5 Hhds. of Claret at 85 Livres, 2 Sols, 7 Denires *per* Hhd.

To 9 Ps. of Prunes, bought of Mr. *Henry Sappier* and Co.

Contents, viz.

| | | | |
|---|---|---|---|
| | Nº. 1——— | 879*lb.* | |
| | 2——— | 756 | Tare 89*lb.* ½ each |
| | 3——— | 572 | Gr. 7355 |
| | 4——— | 907 | Tret 805,5 |
| T. K. | 5——— | 767 | |
| | 6——— | 942 | Nt. 6549,5 at 6Ss. 5Des. *per lb.* |
| | 7——— | 876 | |
| | 8——— | 721 | *Anſw.* 198*l.* 5*s.* 5¼*d.* |
| | 9——— | 875 | |

To my Commiſſion at 2 ¼ *per Cent.* Exchange at 55*s.* ¼ *per French* Crown.

# Invoice from VIRGINIA.

Eleven Hhds. of Tobacco Mark'd as *per* Margin, ſhipped on Board the *Andaluſia, Ebenezer Bradſhaw*, Maſter, for the proper Accompt and Riſque of *Abraham Purſer*, Merchant in *London*, *viz.*

| | | | | |
|---|---|---|---|---|
| | Nº. 1 | *Qt.* 2*C.* | 0*qrs.* | 17*lb.* |
| | 2— | 2 | 3 | 15 |
| | 3— | 3 | 0 | 5 |
| | 4— | 1 | 3 | 22 |
| | 5— | 3 | 1 | 00 |
| A. R. | 6— | 1 | 3 | 27 |
| | 7— | 2 | 1 | 19 |
| | 8— | 2 | 2 | 14 |
| | 9— | 2 | 1 | 19 |
| | 10— | 3 | 0 | 4 |
| | 11— | 2 | 3 | 5 |

Tare 2*qrs.* 7*lb. per* Hhd. Tret 4*lb. per* 104*lb.* I demand the Neat Weight, and what it comes to at 7*d* ½ *per* Pound ?

*Anſwer* 72*l.* 0*s.* 0*d.*

## Invoice from ROTTERDAM.

*Aug*. 5. 1760. Invoice of eight Pieces of Holland, 9 Pieces of Cambrick, 11 Pieces of Ghentiſh Cloth, ſhipped by me *Zachary Watſon*, on board the *Great Britain*, *Robert Vernon* Maſter, for the proper Accompt and Riſque of *Aaron Drawwater*, Trader in *London*, Marked as *per* Margin, Contents, Coſt and Charges, *viz*.

| | N°. | *Qt.* Ells *Flem.* | Gil. | Stiv. |
|---|---|---|---|---|
| | 1 | 42½ | | |
| | 2 | 29¼ | | |
| | 3 | 31½ | | |
| A. D. | 4 | 28¾ | | |
| | 5 | 37¼ | | |
| | 6 | 40¼ | | |
| | 7 | 71½ | | |
| | 8 | 39 | | |
| Holland | | at | 1 | 3 *per Ell* |

Exchange at 34*s* 6*d* Flemiſh *per* Pound Sterling.

9 Ps. of Cambrick Qt. 142½ Ells Fl. at 1*G*. 2*S*. 11*D*. *per E*.

11 Ps. of Ghentiſh Cloth, Qt. 152 Ells ¼ Fl. at 18*St*. 1*D*. *per Ell*.

| Charges. | G. | S. | D. |
|---|---|---|---|
| To Wareh. Room | 3 | 11 | 4 |
| To Average and Portage | 0 | 11 | 10 |
| To Cuſtoms of the Holland. | 9 | 5 | 4 |
| To Cuſtoms Brokerage of the Camb. | 20 | 1 | 2 |
| To Cuſtom of the Ghentiſh Cloth. | 10 | 0 | 4 |
| Total £ | 201 | 5 | 2¼ |

To my Commiſſion at 3¼ *per Cent*.

Invoice

# Invoice from LONDON.

*April* 30, 1760. 9 Hhds of Tobacco, 4 Bales of Woollen Cloth, and 140 Quarters of Wheat, as *per* Margin, ſhipped on board the *Duke* of *York*, *Joſhua Holland* Maſter, for the proper Account of *Martin Ladair*, Merchant in Naples, Contents, *viz.*

| | | | *C* | *Q* | *lb.* | | *Q.* | *lb.* | | *l.* | *s.* | *d.* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Nº. 1 | Qt. | 2 | 0 | 15 | Tare | 1 | 11 | at | 4 | 3 | 9 | *per Cwt.* |
| | 2 | | 2 | 1 | 13 | | 1 | 17 | at | 4 | 1 | 7 | |
| | 3 | | 3 | 0 | 3 | | 1 | 22 | at | 4 | 3 | 11 | |
| | 4 | | 2 | 3 | 2 | | 1 | 9 | at | 3 | 12 | 5 | |
| M L | 5 | | 2 | 1 | 15 | | 1 | 7 | at | 3 | 19 | 10 | |
| | 6 | | 3 | 1 | 7 | | 1 | 13 | at | 2 | 16 | 9 | |
| | 7 | | 2 | 3 | 16 | | 1 | 19 | at | 4 | 7 | 8 | |
| | 8 | | 3 | 3 | 13 | | 1 | 26 | at | 3 | 13 | 3 | |
| | 9 | | 1 | 3 | 27 | | 1 | 11 | at | 3 | 15 | 1 | |

Cloth 4 Bales, Qt. each 12 ſhort Cloths, at 14*l. per* Cloth.
The 140 Quarters of Wheat at — 1*l.* 7*s. per Qr.*
To my Commiſſion at $1\frac{3}{4}$ *per Cent.*

£958 11*s.* 5*d.*

# AN APPENDIX OF Croſs Multiplication.

BECAUSE moſt Workmen, in caſting up their Demenſions, make Uſe of Croſs Multiplication, to make this little Book of more general Uſe, I have added this ſmall Appendix.

## GENERAL RULE.

Feet multiplied by Feet, produce Feet; Feet multiplied by Inches, produce Inches; Feet multiplied by Parts, produce Parts; every Twelve being one Inch.

Inches multiplied by Inches, produce Parts; Inches multiplied by Parts, produce Seconds; every Twelve being one Part.

Parts multiplied by Parts, produce Thirds, every Twelve being one Second.

*N. B.* Glaſier's Work, and rubbed and gauged Brick Work, are meaſured by the Foot ſquare.

Painting, Paving, Plaſtering and Wainſcoting, are meaſured by the ſquare Yard of 9 Feet.

Tyling, Raſtering and Flooring, are meaſured by the Square, containing 100 ſquare Feet.

Common Brick-work is meaſured by the ſquare Rod, containing 272¼ ſquare Feet: But if the Wall be not one Brick and half thick, it muſt be reduced to that Standard, by this General Rule:

Multiply the ſuperficial Content of the Wall, by the thickneſs thereof, in half Bricks; divide that Product by 3, and the Quotient is the true Quantity.

EXAMALES.

## EXAAMPLES.

A Window is 6 Feet, 6 Inches high, and 3 Feet 4 Inches broad; how many ſquare Feet of Glazing are there? *Anſwer* 21 Feet 8 Inches. To find which, place the Dimenſions as follow.

F. I.
6 6
3 4

2 2 0 Product by 4 Inches
19 6 1 Product by 3 Feet

21 8 0 the Anſwer.

If a Window be 8 Feet 4 Inches high, and 4 Feet 6 Inches broad; how many ſquare Feet of Glaſing are there?

F. I.
8 4
4 6

4 2 0 Product of 6 Inches
33 4 0 Product of 4 Feet

37 6 0 The Anſwer.

A Ceiling is 13 Feet broad, and 17 Feet 4 Inches long, how many Yards doth it contain? *Anſwer* 25 Yards.

F. I.
17 4
13

9)225 4

25

Or thus by dividing the Breadth into two Parts, as 10 and 3, and multiplying the Length by each; and adding the Product together, and dividing the Sum by 9, as before, which way I prefer when the Dimenſions are large.

F. I.

| F. | I. | | | F. | I. | |
|---|---|---|---|---|---|---|
| 17 | 4 | | | 17 | 4 | |
| | 10 | | | | 3 | |
| 173 | 4 | | | 52 | 0 | |
| 52 | 0 | | | | | |
| 9)225 | 4 | | | | | |
| 25 | | | | | | |

A Floor is 24 Feet 6 Inches long, and 17 Feet 6 Inches broad, how many Squares doth it contain ?

| F. | I. | | | F. | I. | |
|---|---|---|---|---|---|---|
| 24 | 6 | | | 24 | 6 | |
| | 10 | | | | 7 | 6 |
| 245 | 0 | | | 12 | 3 | 0 |
| 183 | 9 | | | 171 | 6 | |
| 100)428 | 9(4 Square | | | 183 | 9 | 0 |
| 400 | | | | | | |
| 28 | 9 | | | | | |

*Anſwer* 4 Squares, 28 Feet 9 Inches.

*N. B.* in this the Breadth is divided into 10 Feet, and 7 Feet 6 Inches.

If a Piece of Tyling be 40 Feet 6 Inches long, and 13 Feet 3 Inches Broad ; how many Squares are there in it ? *Anſwer* 5 Squares, 36 Feet, 7 Inches and a half or 6 Parts.

| F. | I. | | | F. | I. | |
|---|---|---|---|---|---|---|
| 40 | 6 | | | 40 | 6 | |
| | 10 | | | | 3 | 3 |
| 405 | 0 | | | 10 | 1 | 6 |
| 131 | 7 | 6 | | 121 | 6 | |
| 100)536 | 7 | 6)5 Squares | | 131 | 7 | 6 |
| 500 | | | | | | |
| 36 | | | | | | |

*N. B.* In this, the Breadth is divided into 10 Feet, and 3 Feet 3 Inches.

If a Brick Wall be 40 Feet long, and 9 Feet 11 Inches high, and $1\frac{1}{2}$ Brick thick, how many Rod and Feet doth it contain.

F. I.
40 0
9 11

36 8 0
360 0

$272\frac{1}{4}$)396 8 0(1 Rod

124 5

Or thus by dividing the Length into 4 Parts of 10 Feet each, and multiplying the Height by one of the Parts, and that Product by 4, and then divide by $272\frac{1}{4}$, as before.

F. I.
9 11
10

99 2
4

$272\frac{1}{4}$)396 8(1 Rod

124 5

So that it contains one Rod, 124 Feet, and 5 Inches.

If a Brick Wall 2 Bricks thick, be 50 Feet 6 Inches in Length, 14 Feet 9 Inches high from the Foundation, the true Content (after it is reduced to the Standard, *viz.* $1\frac{1}{2}$ Brick thick) is required.

F. I.

| F. | I. | | |
|---|---|---|---|
| 50 | 6 | | |
| 14 | 9 | | |
| 37 | 10 | 6 | Product by 9 Inches |
| 505 | 0 | 0 | Product by 10 Feet |
| 202 | 0 | 0 | Product by 4 Feet |
| 744 | 10 | 6 | Superficial Content |
| | | 4 | Half Bricks thick |
| 3)2979 | 6 | 0 | |
| 993 | 2 | | |

So the Content of the Wall is 993 Feet 2 Inches, which divided by 272¼, gives 3 Rod, 176 Feet and 5 Inches.

If a Board be 7 Feet 9 Inches long, and 1 Foot 5 Inches broad, What is the Superficial Content? *Anſwer* 10 Feet 11 Inches.

If a Room be 27 Feet 6 Inches long, and 17 Feet 5 Inches broad, how many ſquare Feet are contained in that Room? *Anſwer* 478 Feet 11 Inches.

If a Plank be 9 Feet 5 Inches 6 Parts long, and 3 Feet 4 Inches 5 Parts broad, how many ſquare Feet are contained therein? *Anſwer* 31 Feet 10 Inches, 3 Parts 3 Seconds 6 Thirds.

If a Room be 109 Feet 6 Inches round, and 12 Feet 4 Inches high, how many ſquare Feet are contained therein? *Anſwer* 1350 Feet 6 Inches.

Suppoſe a Piece of Wood is 1 Foot 5 Inches ſquare, and 20 Feet 6 Inches long, how many ſolid Feet are contained therein? *Anſwer* 41 Feet, 1 Inch, 8 Pars, 6 Seconds.

If a Pane of Glaſs be 1 Foot, 3 Inches, 6 Parts long, and 10 Inches 5 Parts broad, and 18 Panes in that Window, how many ſquare Feet are contained therein? *Anſwer* 20 Feet 2 Inches 2 Parts 3 Seconds.

What will be the Product of 478 Feet 10 Inches, multiplied by 249 Feet 9 Inches? *Anſwer* 119588 Feet, 7 Inches, 6 Parts.

Multiply 57 Feet, 10 Inches, 7 Parts, by 38 Feet 10 Inches 11 Parts. *Anſwer* 2252 Feet, 2 Inches, 0 Parts, 6 Seconds, 5 Thirds.

A Marble Slab 7 Feet 9 Inches in Length, and 2 Feet 3

Inches in Breadth, I demand the Value at 5*s.* 5½*d per* Foot? *Anſwer* 4*l.* 15*s.* 2*d.*

Admit a Wall to be 74 Feet 6 Inches long, and 11 Feet 5 Inches high, and 2 Bricks and a half thick, how many Rods are contained therein? *Anſwer* 5 Rod 56Feet.

If a Cieling be 37 Feet 7 Inches in Length, and 17 Feet 5 Inches in Breadth, what will the Plaiſtering come to at 9½*d. per* Yard? *Anſwer* 2*l.* 17*s.* 7½*d.*

Suppoſe the Length of a Houſe be 34 Feet 6 Inches, and the Breadth of the Paving 21 Feet 9 Inches, what will the Expence of the Paving come to at 3*s.* 9*d. per* Yard? *Anſwer* 15*l.* 12*s.* 7¾*d.*

A Triangular Skylight, whoſe Baſe is 10 Feet 9 Inches long, and the Perpendicular 17 Feet 11 Inches, what will the Glazing come to at 9¾*d. per* Foot? *Anſwer* 3*l.* 18*s.* 2¼*d.*

All Triangles are equal to ½ the Parallelogram, whoſe Length is the ſame as the Baſe of the Triangle, and Breadth equal to the Perpendicular. Then to get the Area of a Triangle, multiply ½ the Baſe by the Perpendiclar, or ½ the Perpendicular by the Baſe; and the Product is the Area.—Or multiply the whole Baſe by the Perpendicular, and divide the Product by 2, gives the Area as before.

Suppoſe the Compaſs of a Room be 110 Feet 9 Inches, and the Height 11 Feet 3 Inches (taking in the Corniſh and Mouldings) 3 Window Shutters, each 8 Feet 4 Inches, by 4 Feet 3 Inches, and the Door 8 Feet 9 Inches, by 3 Feet 10 Inches, the Shutters and Doors being worked on both Sides is reckoned Work and half Work; what will the Wainſcotting of the Room come to at 5*s.* 6*d. per* Yard ſquare? *Anſwer* 44*l.* 9*s.* 6½*d.*

A Gentleman agreed with a Paper Merchant, for 5 Rooms to be hung with Paper, 1 Foot 9 Inches broad, at 8½ *per* Yard, the Contents whereof are under expreſſed; what did the whole amount to?

| | | | Feet | In. | | F. | I. | |
|---|---|---|---|---|---|---|---|---|
| The | 1ſt. | Room is | 110 | 7 | Round and | 10 | 9 | high |
| | 2d. | | 95 | 4 | | 9 | 7 | |
| | 3d. | | 87 | 8 | | 8 | 6 | |
| | 4th | | 79 | 11 | | 8 | 7 | |
| | 5th | | 73 | 10 | | 7 | 9 | |

*Anſwer* 27*l.* 13*s.* 11*d.*

Divide the whole Content by the ſquare Feet in a Yard of Paper.

A Plaiſterer agreeth about a Piece of Work, the Contents whereof are under expreſſed; for the Price of which it was agreed, *viz* for Lathing and Plaiſtering, 10½ *per* Yard ſquare, for Rendering Work 3½*d per* Yard ſquare, what did each amount to?

| Lathing and Plaiſtering | | | | | Rendering Work | | | | |
|---|---|---|---|---|---|---|---|---|---|
| F. | I. | | F. | I. | F. | I. | | F. | I. |
| 20 | 0 | by | 9 | 0 | 18 | 5 | by | 8 | 8 |
| 15 | 6 | by | 9 | 0 | 14 | 3 | by | 15 | 2 |
| 14 | 9 | by | 8 | 4 | 14 | 2 | by | 13 | 2 |
| 16 | 10 | by | 9 | 0 | 15 | 7 | by | 8 | 8 |
| 20 | 0 | by | 15 | 6 | 18 | 11 | by | 10 | 10 |
| 20 | 4 | by | 11 | 6 | 15 | 2 | by | 10 | 10 |
| 15 | 10 | by | 11 | 6 | 13 | 2 | by | 13 | 11 |
| 13 | 10 | by | 11 | 6 | 14 | 6 | by | 14 | 10 |
| 15 | 4 | by | 11 | 6 | 18 | 9 | by | 8 | 7 |
| 20 | 4 | by | 15 | 10 | 15 | 2 | by | 8 | 7 |
| 20 | 8 | by | 9 | 4 | 13 | 11 | by | 8 | 7 |

*Anſwer* { Lathing and Plaiſtering 10*l* 11*s* 0½*d*
Rendering Work 3 0 8¾

A Gentleman agrees for the Painting of a Room, which meaſures as follows; the Height taking in the Corniſh and Mouldings, is 12 Feet 10 Inches, the Compaſs of the Room is 109 Feet 9 Inches, the Door 6 Feet 11 Inches, by 4 Feet 2 Inches; four Window Shutters, each 5 Feet 11 Inches, by 3 Feet 7 Inches; the Breakers in the Window 10 Inches deep; the Chimney 7 Feet 2 Inches, by 4 Feet 10 Inches; to be deducted a Cloſet the Height of the Room, 5 Feet 3 Inches in Front, and 3 Feet 9 Inches deep, the Shelvings together 17 Feet 10 Inches, by 11 Inches, the Doors, Shutters and Shelves being painted on both Sides, what will the whole Expence come to at 9½*d. per* Yard ſquare? *Anſwer* 7*l* 9*s* 5¼*d.*

A Carpenter bought 8 Pieces of Fir, Contents as under, *viz.*

| No. | F. | I. | | F. | I. | | F. | I. |
|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 5 | by | 1 | 7 | | 15 | 9 |
| 2 | 1 | 3 | by | 1 | 6 | | 14 | 10 |
| 3 | 1 | 7½ | by | 1 | 9 | | 16 | 4 |
| 4 | 2 | 5 | by | 1 | 10 | thick and length | 11 | 6 |
| 5 | 1 | 6 | by | 1 | 5½ | | 15 | 7 |
| 6 | 1 | 11 | by | 1 | 4 | | 17 | 9½ |
| 7 | 2 | 2 | by | 1 | 10 | | 14 | 6 |
| 8 | 1 | 9 | by | 1 | 3 | | 15 | 9 |

What is the ſolid Content of the whole, and what is the Value at 5*s* 9*d per* Foot ſolid?

*Anſwer* { The ſolid Content 332 Feet, 1 Inch, 9 Parts.
The Value of the whole 95*l* 9*s* 10*d*.

Admit the end Wall of a Houſe 34 Feet 10 Inches in Length, and the Height from the Ground to the Roof is 49 Feet 10 Inches, the triangular Part, or Gable at Top, to riſe 39 Courſes of Bricks, reckoning 4 Courſes to a Foot; now the firſt 10 Feet high, 3 Bricks thick, the next 12 Feet 2½ Bricks thick, the next 12 Feet 2 Bricks thick; and 15 Feet 10 Inches at 1½ Brick thick, the Gable 1 Brick thick, what will be the Expence at 6*l* 15*s per* Rod? *Anſwer* 67*l* 14*s* 3¼*d*.

Admit a Piece of ſquared Timber to be 2 Feet 7 Inches in depth, and 1 Foot 9 Inches broad, and 15 Feet 6 Inches long, I demand how many ſolid Feet are contained therein, and what it comes to at 2*s* 9½*d per* Foot? *Anſwer* 9*l* 5*s* 1¾*d*.

Suppoſe the Roof of a Houſe covered with Slates, and the depth on both Sides (with the uſual Allowance being made) is 41 Feet 7 Inches, and the Length 53 Feet 2 Inches, the Queſtion is to know how many ſquares of Slating are contained therein, and what will be the Expence at 6*l*. 18*s*. *per* Square.

*Anſwer* { Squares 22 10 Feet 9 Inches.
The Expence 152*l*. 10*s*. 11¼*d*.

A

I have 2 Vaults to be dug by the Floor, the Length of the firſt is 42 Feet 7 Inches, and the Breadth is 22 Feet 7 Inches; the Length of the ſecond is 29 Feet 6 Inches, the Breadth is 16 Feet 4 Inches, and their Depths are to be 7 Feet 10 Inches, the Queſtion is to know how many Floors of Earth are in theſe Vaults? *Anſwer* 34,8996 Floors.

*Note,* That 18 Feet ſquare, and a Foot deep is a Floor of Earth, that is 324 ſolid Feet.

A Carpenter bought a Piece of ſquare Timber at 1*s* $9\frac{1}{2}$*d per* Foot, being $17\frac{1}{2}$ Inches ſquare at the greater End; and $11\frac{1}{4}$ Inches at the leſſer End; and 18 Feet long, I deſire to know the Value? *Anſwer* 2*l.* 7*s.*

A Maltſter bought a Ciſtern in form of a Cylinder, the Diameter being 3 Feet 9 Inches, and Depth 4 Feet 6 Inches, how many Quarters of Corn will it hold, admitting $2150\frac{4}{10}$ ſolid Inches, to be a *Wincheſter* Buſhel? *Anſwer* 5 Quarters nearly.

Suppoſe a rectangular Ciſtern be 10 Feet 6 Inches long, and 4 Feet 9 Inches broad, and 5 Feet 6 Inches deep, how many Gallons of Water will it hold, admitting 282 ſolid Inches to a Gallon? *Anſwer* $1680\frac{42}{47}$ Gallons.

Suppoſe the Circumference of a Conical Church Spire at the Baſe to be 59 Feet, and the Altitude 109 Feet, what will the Painting come to at $7\frac{1}{2}$*d per* Yard? *Anſwer* 11*l* 4*s* $1\frac{1}{2}$*d.*

Having agreed with a Paviour, to pave a Court-yard 38 Feeet 9 Inches in Front, and 98 Feet 7 Inches in Depth, being minded to have a Foot-Path, to be laid with Purbeck Stone at 5*s* 6*d per* Yard ſquare, and the reſt with Pebbles at 2*s* 9*d per* Yard, I deſire to know what the whole Expence will be? *Anſwer* 65*l* 1*s* $8\frac{3}{4}$*d.*

Admit a Piece of Timber to be 29 Inches in Breadth, and 18 Inches in Depth, at the greater End, and 14 Inches in Breadth and 8 Inches in Depth at the leſſer End, and 24 Feet long, how many Feet of Timber are contained therein, and what is the Value at 1*s* 7*d per* ſolid Foot? *Anſwer* 3*l* 17*s.*

How many Tons of Timber are contained in a Tree 15 Feet 9 Inches in the Girt, 75 Feet 6 Inches long, and what is the Value at 2*l* 17*s* 9*d per* Ton?

*Anſwer* { 33 Ton, 31 Feet, 5 Inches
The Value is 97*l* 11*s* $1\frac{1}{4}$*d.*

*Note,* 50 Feet is a Load of Timber, and 40 Feet is a Ton:

A Piece of Marble 4 Feet 7 Inches long, and 2 Feet 6 Inches broad, and 1 Foot 10 Inches deep, and weighs, 720*lb.* how many Cubic Feet muſt there be to freight a Ship of 500 Tons, and what will be the Value at 5*s* 9*d per* ſolid Foot?

*Anſwer* { 32666,66 Cubic Feet
The Value is 9391*l* 13*s* 3¾*d.*

**FINIS.**

BRITISH MUSEUM
16 JY 73

# A TABLE OF CONTENTS.

Page
THE Introduction 1
Notation
Addition 2
Subtraction 18
Multiplication 23
Diviſion 30
Reduction 34
The ſingle Rule of Three Direct. 41
—— Reverſe 45
Practice 47
Tare and Tret 56
Vulgar Fractions 58
Abbreviation of Vulgar Fractions. 59
Reduction 61
Addition 65
Subtraction 66
Multiplication 67

Page
Diviſion 68
The Rule of Three Direct. 69
—— Reverſe 70
Double Rule of Three 71
Notation of Decimal Fractions. 72
Addition 73
Subtraction 74
Multiplication 75
Diviſion
Reduction 76
To find the Value of a Decimal Fraction 78
The Rule of Three 79
Barter 81
Loſs and Gain 82
Fellowſhip 83

Double

*Page*
Double Rule of Three in whole Numbers 86
Queſtions to Exerciſe the foregoing Rules 88
Exchange 95
Simple Intereſt 99
Rebate or Diſcount 103
Annuities in Arrears 105
Annuities and Leaſes taken in Reverſion 112
Equation of Payments 114
Compound Intereſt 116
Annuities or Penſions in Arrears 118
Of Annuities, Leaſes, &c. taken in Reverſion 121
Of Purchaſing Freehold Eſtates 124
Of Freehold Eſtates in Re-Reverſion 125

*Page*
Rebate or Diſcount 126
Arithmetical Progreſſion 131
Geometrical Progreſſion 133
Variation of Quantities 135
Combination of Quantities 136
Allegation Medial
Allegation Alternate 137
Single Poſition 140
Double Poſition 142
Extraction of the Square Root 143
Extraction of the Cube Root 148
Queſtions to exerciſe the Cube Root 151
Practical Queſtions 153
Bills of Parcels 169
Bills of Book Debts 174
Invoices 178
Appendix 181

BRITISH MUSEUM 16 JY 73

e
6
1
3
5
6
7
0
2
3
8
1
3
9
4
8
1